
FINAL

**SITE INSPECTION ADDENDUM
WORK PLAN**

JOLIET ARMY AMMUNITION PLANT, ILLINOIS

FEBRUARY 2009

Prepared for:

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FINAL

SITE INSPECTION ADDENDUM

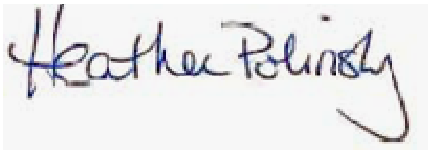
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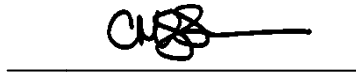
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W912DR-05-D-0004

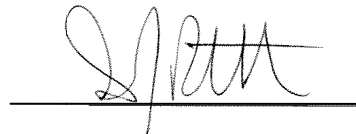
Reviewed and Approved by:

A handwritten signature in blue ink that reads "Heather Polinsky". The signature is written over a horizontal line.

Heather Polinsky, Vice President
Program Officer
Malcolm Pirnie, Inc.

A handwritten signature in black ink that reads "Courtney M.S. Ingersoll". The signature is written over a horizontal line.

Courtney M.S. Ingersoll
Project Manager
Malcolm Pirnie, Inc.

A handwritten signature in black ink that reads "Greg Peterson". The signature is written over a horizontal line.

Greg Peterson
UXO Safety Officer
Malcolm Pirnie, Inc.

Malcolm Pirnie, Inc., prepared this report at the direction of the United States Army Corps of Engineers (USACE). This document should be used only with the approval of the USACE. This report is based, in part, on information provided in other documents and is subject to the limitations and qualifications presented in the referenced documents.

FEBRUARY 2009

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ACRONYMS

Acronym	Definition
BLU	Bomb Live Unit
CCV	Continuing Calibration Verification
CIH	Certified Industrial Hygienist
CSM	Conceptual Site Model
CTT	Closed, Transferred, and Transferring
DMM	Discarded Military Munitions
DoD	Department of Defense
DNB	Dinitrobenzene
DNT	Dinitrotoluene
DQCR	Daily Quality Control Report
DQO	Data Quality Objective
EE/CA	Engineering Evaluation / Cost Analysis
ERIS	Environmental Restoration Information System
FPM	Field Project Manager
FS	Feasibility Study
GPS	Global Positioning System
H&S	Health and Safety
HASP	Health and Safety Plan
HMX	Tetrahexaminetetranitramine
HRR	Historical Records Review
HSD	Health and Safety Director
ICM	Improved Conventional Munitions
IL	Illinois
IRP	Installation Restoration Program
JOAAP	Joliet Army Ammunition Plant
MC	Munitions Constituents
MD	Maryland
MEC	Munitions and Explosives of Concern
MMRP	Military Munitions Response Program
MRS	Munitions Response Site

Acronym	Definition
MRSP	Munitions Response Site Prioritization Protocol
NB	Nitrobenzene
NFA	No Further Action
NT	Nitrotoluene
PM	Project Manager
POC	Point of Contact
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
QCS	Quality Control Sample
RA	Removal Action
RDX	Cyclotrimethylenetrinitramine
RG	Remediation Goal
RI	Remedial Investigation
ROD	Record of Decision
ROE	Right of Entry
SI	Site Inspection
SOW	Scope of Work
SSC	Site Safety Coordinator
SS-HASP	Site-Specific Health and Safety Plan
SS-QAPP	Site-Specific Quality Assurance Project Plan
TNB	Trinitrobenzene
TNT	2,4,6-Trinitrotoluene
TPP	Technical Project Planning
U.S.	United States
USACE	United States Army Corps of Engineers
USAEC	United States Army Environmental Command
USEPA	United States Environmental Protection Agency
UXO	Unexploded Ordnance
UXOSO	Unexploded Ordnance Safety Officer

1 INTRODUCTION

Malcolm Pirnie, Inc., (Malcolm Pirnie) has prepared this Work Plan for the Site Inspection (SI) Addendum of Military Munitions Response Program (MMRP) eligible sites at Joliet Army Ammunition Plant (JOAAP), Illinois (IL), under United States (U.S.) Army Corps of Engineers (USACE) Contract Number W912DR-05-D-0004, Delivery Order 66.

JOAAP is located in Will County, IL and was one of the largest and most productive ordnance complexes in the U.S., having assembled over 4 billion pounds of military munitions. JOAAP encompasses approximately 23,000 acres 10 miles south of Joliet, IL and 40 miles southwest of Chicago, IL. All production halted in 1976, and the plant was assigned a non-operating status in 1977. JOAAP currently is undergoing closure activities in order to complete the transfer of lands.

This Work Plan has been developed to provide a description of the tasks necessary to complete this project and to ensure the project will conform to the USACE, Baltimore District Scope of Work (SOW), dated 21 February 2008. This Work Plan includes the following project specific information:

- Project objectives
- Project management
- Schedule
- Personnel
- Site location and history
- Field work
- Health and safety (H&S)

The Health and Safety Plan (HASP) (Appendix A), Technical Project Planning (TPP) Meeting Minutes (Appendix B), MEC (Munitions and Explosives of Concern) / Multiple Anomaly Discovery Form (Appendix C), previously approved Improved Conventional Munitions (ICM) Waiver and Amendment (Appendix D), Right of Entry Form (Appendix E), Data Quality

Control Report Form (Appendix F), and ERIS Database Format Example (Appendix F) are incorporated into this Work Plan.

This Work Plan will be used with the understanding that unanticipated conditions may dictate a change in the plan as written. Any necessary deviations from the plan will be verbally brought to the attention of the USACE, Baltimore District Project Manager (PM) as soon as possible. The decision will be documented in the daily field notes as well as in the SI Report Addendum.

1.1 PROJECT OBJECTIVES

The SI Addendum at JOAAP will address the exposure from the hazards of MEC contamination at the newly identified munitions response site (MRS), the L2-L3 Extended Buffer Area (JAAP-001-R-02). The purposes of this project are to determine the presence or absence of MEC possibly remaining from activities conducted by the Department of Defense (DoD) that may pose a threat to human health and/or the environment, and to better define the boundary of where these MEC are located.

The primary goal of the SI Addendum field work for the site is to further define the site boundary. The presence of MEC within the L2-L3 Extended Buffer Area has been determined by previous studies and removal actions as depicted in the JOAAP Historic Records Review (HRR) Addendum, November 2008. The MRS boundary will be further defined by collecting the appropriate amount of information necessary to make one of the following decisions: 1) whether a Remedial Investigation (RI) / Feasibility Study (FS) is required at a site; 2) whether an immediate response is needed; or 3) whether the site qualifies for no further action (NFA). These determinations will be made using data gathered during site investigation activities. The on-site investigation using a random transect spoke and wheel method of instrument-assisted visual survey will gather sufficient data to determine the presence or absence of MEC on the surface. MEC include ICM, discarded military munitions (DMM), and unexploded ordnance (UXO). Data collected will be used to develop or expand the conceptual site model (CSM) for the site, conduct initial munitions hazard screening and summarize information, and recommend future site actions. A more accurate MEC boundary will be determined in the event MEC items

are encountered either short of the L2-L3 Extended Buffer Area or extending past the presently marked boundary.

The secondary goal of the SI Addendum is to collect information for building the MMRP, to include cost-to-complete estimates and data needed to apply the MRS Prioritization Protocol (MRSP).

1.2 PROJECT MANAGEMENT

Malcolm Pirnie will provide all of the documents and will participate in all of the meetings and conference calls in accordance with the protocols stated in the USACE, Baltimore District SOW. The project schedule and personnel involved are outlined below.

1.2.1 Project Schedule

The project schedule has been established according to the performance of the following tasks as delineated by the USACE, Baltimore District SOW.

Task 1 – Stakeholder involvement

Task 2 – Historical Records Review (HRR) Addendum

Task 3 – TPP

Task 4 – SI Addendum

The project schedule/status is provided in Table 1-1.

Table 1-1: Project Schedule

Task	Completion Date	Task Status
Host TPP Session 1 (kickoff meeting)	6/11/2008	Complete
Stakeholder involvement	6/11/2008 – completion of project	Complete
Stakeholder Draft HRR	9/16/2008	Complete
Host TPP Session 2	10/15/2008	Complete
Final TPP Memorandum	10/28/2008	Complete
Final HRR	11/12/2008	Complete
Internal Draft Work Plan	11/21/2008	Complete
Stakeholder Draft Work Plan	12/18/2008	Complete
Final Work Plan	2/13/2009	Planned
SI Addendum MEC Field Work	3/01/2009–3/06/2009	Planned
Stakeholder Draft SI Addendum Report	6/22/2009	Planned (estimated)
Host TPP Session 3	7/7/2009	Planned (estimated)
Final SI Addendum Report	7/30/2009	Planned (estimated)

1.2.2 Project Personnel

1.2.2.1 Malcolm Pirnie Project Personnel

Malcolm Pirnie project personnel and their responsibilities are listed in Table 1-2.

Table 1-2: Project Personnel

Name	Title
Heather Polinsky	Malcolm Pirnie Program Manager
George Overby	Malcolm Pirnie Quality Control (QC) Officer
Chuck Myers, Certified Industrial Hygienist (CIH)	Malcolm Pirnie Health and Safety Director (HSD)
Courtney MS Ingersoll	Malcolm Pirnie PM
Catherine Kelly	Deputy PM / Field Project Manager (FPM)
Greg Peterson	Malcolm Pirnie Site Safety Coordinator (SSC) / UXOSO (Unexploded Ordnance Safety Officer)
Marla Miller	Malcolm Pirnie Project Chemist

Malcolm Pirnie Program Manager – Heather Polinsky

The Malcolm Pirnie Program Manager oversees the Malcolm Pirnie PM and reports directly to the USACE, Baltimore District PM. Any issues or problems the USACE, Baltimore District may experience with the Malcolm Pirnie PM may be addressed to the Malcolm Pirnie Program Manager. The Malcolm Pirnie Program Manager has full authority over the performance of the project and can direct changes in project implementation.

Malcolm Pirnie QC Officer – George Overby

The Malcolm Pirnie QC Officer is responsible for the project-specific supervision and monitoring of the QC program and reports to the PM and Corporate Quality Assurance (QA) Manager.

Malcolm Pirnie Corporate HSD – Chuck Myers, CIH

The Malcolm Pirnie Corporate HSD maintains the organizational freedom and authority for ensuring full implementation of the Site-Specific HASP (SS-HASP) and Malcolm Pirnie's corporate H&S policy. The HSD can direct how the SS-HASP is implemented. This can include delegating authority to other personnel and directing the enforcement of the SS-HASP, including removing individuals from the project for noncompliance.

Malcolm Pirnie PM – Courtney MS Ingersoll

The Malcolm Pirnie PM has ultimate responsibility for all aspects of the project and reports directly to the Malcolm Pirnie Program Manager, Malcolm Pirnie Corporate HSD, and the USACE, Baltimore District PM. The Malcolm Pirnie PM is also responsible for project personnel safety and health, including correction of all identified unsafe acts or conditions and enforcement of procedures and regulations. Communication pathways are described in Table 1-3.

Table 1-3: Communication Pathways

Communication Drivers	Responsible Entity	Name	Phone Number	Procedure (Timing, Pathways, etc.)
Stop work and initiation of corrective action	Malcolm Pirnie	Courtney Ingersoll, PM	757-873-4415 (office) 757-753-8859 (cell)	Communicate with the USACE, Baltimore District PM and Malcolm Pirnie PM within 24 hours of the stop work. Communicate to the project organization with a confirming email.
Real-time modification, notifications, and approval	Malcolm Pirnie	Courtney Ingersoll, PM	757-873-4415 (office) 757-753-8859 (cell)	Real-time modification to the project will require the approval of the USACE, Baltimore District PM and Malcolm Pirnie Program Manager and will be documented.
Reporting of serious issues	Malcolm Pirnie	Courtney Ingersoll, PM	757-873-4415 (office) 757-753-8859 (cell)	Any serious injuries will be reported to the USACE, Baltimore District PM, Malcolm Pirnie Program Manager and Malcolm Pirnie HSD by telephone and follow-up by email or memorandum will occur.

Malcolm Pirnie Deputy PM / FPM – Catherine Kelly

The Malcolm Pirnie FPM is the primary contact for performance of field activities. The FPM is responsible for work with field staff for the implementation of the Work Plan, including the project QA/QC requirements. The FPM will be on-site during field activities.

Malcolm Pirnie SSC/UXOSO – Greg Peterson

The Malcolm Pirnie SSC/UXOSO reports to the Malcolm Pirnie PM for all aspects of the field work and is responsible for enforcing all aspects of safety and health rules, policies, and procedures on behalf of Malcolm Pirnie. The Malcolm Pirnie SSC/UXOSO will be on site for the field work to provide UXO avoidance support.

1.2.2.2 Other Project Personnel

Table 1-4 lists the additional individuals and associated agencies/organizations involved with this project. They are also included on the document distribution list.

Table 1-4: Other Project Personnel

Name	Org Code (m/s)	Title	Work Phone	E-Mail	Work Fax	Cell Phone
U.S. Army Environmental Command (USAEC)				@us.army.mil		
Mary Ellen Maly	SFIM-AEC-CDP	MMRP Program Manager	410.436.7083	maryellen.h.maly	410.436.1548	410.652.5610
Andrew Maly	SFIM-AEC	Environmental Restoration Manager	410.436.1611	andrew.maly	410.436.1548	410.322.2416
USACE, Baltimore District				@usace.army.mil		
Travis McCoun	CENAB-EN-HM	PM	410.962.6728	travis.mcCoun		443.844.8192
USACE, Louisville District				@usace.army.mil		
Chris Inlow / Mike Saffran	CELRL-EN-HM	IRP PM	502.315.6802	chris.inlow / mike.saffran	502.315.6793	502.396.5463
JOAAP				@us.army.mil		
Art Holz	JOAAP	Commander's Representative	815.423.2870	arthur.m.holz	815.423.2871	N/A
Tim Jeremiah	JOAAP	Industrial Specialist	815.423.2874	timothy.e.jeremiah	815.423.2871	N/A
U.S. Environmental Protection Agency (USEPA) - Region 5				@epa.gov		
Tom Barounis	USEPA Region 5	Regional Project Manager	312.353.5577	barounis.thomas		
Illinois Environmental Protection Agency (IEPA)				@illinois.gov		
Nicole Wilson	IEPA	PM	217.785.8729	nicole.wilson		

USAEC	SFIM-AEC-RDR, E4480 Beal Road, Aberdeen Proving Ground, MD 21210
USACE, Baltimore District	CENAB-EN-HM (P.O. Box 1715), Baltimore, MD 21203 (FEDEX Address: Room 10000-B, 10 S. Howard St, Baltimore, MD 21201)
USACE, Louisville District	CELRL-PM-M-E, 600 Dr. Martin Luther King, Jr. Place, Louisville, KY 40202
Malcolm Pirnie – Newport News, VA Office	701 Town Center Drive, Suite 600, Newport News, VA 23606
Joliet Army Ammunition Plant	29401 S. Route 53, Wilmington, IL 60481
USEPA Region 5	Mailcode SR-6J, 77 W. Jackson Blvd., Chicago, IL 60604
IEPA	1021 N Grand Ave. E, P.O. Box 19276, Springfield, IL 62794

1.2.2.3 Subcontractors

Subcontractors report to the Malcolm Pirnie FPM and SSC/UXOSO during the performance of the tasks associated with their field work and are responsible for complying with the project Work Plan while on site.

1.3 WORK PLAN ORGANIZATION

The Work Plan consists of seven sections and four appendices, as outlined below.

- **Section 1: Introduction**
- **Section 2: Scope of Work** discusses the proposed activities to be conducted by Malcolm Pirnie as part of the SI.
- **Section 3: Technical Approach** outlines methods and overall QA/QC.
- **Section 4: Field Activities** presents a detailed description of the MMRP site and site-specific field activities for the SI.
- **Section 5: Site-Specific Quality Assurance Project Plan (QAAP)** As munitions constituents (MC) sampling will not be performed in this site inspection, the standard QAAPP has been removed as it does not apply to this field effort.
- **Section 6: Field Documentation** provides details regarding the documentation to be completed while performing field activities.
- **Section 7: References**
- **Appendix A: Health and Safety Plan**
- **Appendix B: Technical Project Planning Meeting Minutes**
- **Appendix C: Munitions and Explosives of Concern / Multiple Anomaly Discovery Sheet**
- **Appendix D: Improved Conventional Munitions Waiver and Amendment**
- **Appendix E: Right-of-Entry Form**
- **Appendix F: Data Quality Control Report**
- **Appendix G: ERIS Database Format Example**

2 SCOPE OF WORK

The five primary events of the MMRP SI Addendum are the HRR Addendum, TPP, SI Addendum Work Plan, SI Addendum field work, and SI Addendum Report. Each of these events is described in more detail in this section.

HRR Addendum – Consists of identifying data gaps from the 1999 Engineering Evaluation / Cost Analysis (EE/CA) and Approval Memorandum; U.S. Army's Phase 3 Closed, Transferring, and Transferred (CTT) Inventory; 2005 MMRP SI of JAAP-001-R-01 and JAAP-002-R-01; 2007 Removal Action (RA) for JAAP-001-R-02; and follow-on site walk outside its site boundary. The HRR Addendum is aimed at developing a draft CSM, focusing field work, and providing a common understanding of the site.

MMRP Site TPP – Consists of planning activities conducted with the stakeholders to identify project objectives and designing data collection programs to meet those objectives.

MMRP SI Addendum Work Plan (this document) – Consists of preparing and submitting a site-specific SI Addendum Work Plan document reflecting the agreements made during the TPP session.

MMRP SI Addendum field work – Consists of performing investigation activities and preparing reports of findings as described in this Work Plan.

MMRP SI Addendum Report – Consists of preparing and submitting an SI Addendum Report summarizing the results of the field work, to include an updated CSM developed for the site with an appendix containing all information necessary to complete the MRSPP.

2.1 HRR ADDENDUM

An HRR Addendum was completed to support the SI Addendum. The document expanded on the information collected during the 1999 EE/CA and Approval Memorandum, Phase 3 CTT

Range Inventory, and 2005 MMRP SI. The HRR Addendum was completed after an additional historical records search was performed to document information for a new MRS identified after the completion of the first HRR and SI. This HRR Addendum provided information pertinent to identifying, verifying, and establishing the physical limits and potential MEC and MC for the site. Historical records, aerial photographs, existing site maps, and existing environmental restoration documents were reviewed and interviews with installation personnel were completed.

The following information is provided in the HRR Addendum:

- Introduction
- Project purpose/scope
- Project drivers
- Background
 - Inventory
 - SI
- Site description
- Data collection and document review process
- HRR findings / MRS
- CSM
 - Physical profile
 - Release profile
 - Land use and exposure profile
 - Ecological profile
 - MEC and MC sources
 - Access
 - Future site use
 - Activity
 - Exposure pathways for MC
 - Exposure media
 - Exposure routes
 - Receptors
- Graphical CSM
- Data gaps

- Recommendations
- Conclusions

As a result of the HRR Addendum, there is one new MRS identified at JOAAP: the L2-L3 Extended Buffer Area (JAAP-001-R-02), which is addressed in this Work Plan. The L2-L3 Extended Buffer Area is approximately 396 acres and is located outside the boundaries of the L2 and L3 Buffer Zones respectively. This newly established MRS is the result of previous studies and investigations at JOAAP. The 2005 JOAAP SI recommended further investigation of the area extending 200 feet from the boundary of the Explosive Burning Ground (L2) and Demolition Area (L3) (Site Inspection Munitions Response Sites, May 2005). Based on this recommendation, a RA was conducted in 2007 in the 200-foot buffer area surrounding both sites. This additional area of concern was identified as a result of findings during the RA that suggested MEC contamination extended beyond this 200 foot buffer area, and the resulting MRS was named the L2-L3 Extended Buffer Area. The MRS currently is undeveloped, but portions are used for agriculture. The planned future use for the site is open space for the USDA Midewin National Tallgrass Prairie. Map 2-1 provides an overview of the L2-L3 Extended Buffer Area.

The Final HRR Addendum report was submitted on 13 November 2008. Comments from the USACE, Baltimore District; USAEC; JOAAP; and the stakeholders were incorporated into the Final HRR Addendum Report. Final Army approval of the Final HRR Addendum was received 24 December 2008 from the USACE, Baltimore District.

2.2 TPP PROCESS / STAKEHOLDER DQO PROCESS

The TPP process is a comprehensive and systematic process involving four phases of planning activities. It was developed for identifying project objectives and designing data collection programs. Use of the TPP process is consistent with the philosophy of taking a graded approach to planning, producing the type and quality of results needed for site-specific decision-making.



Map 2-1

Overview of MRSS

Legend

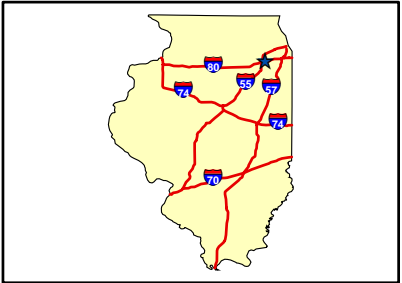
Historic LAP Area

- Historic LAP Area
- Railroads
- Roads
- Streams
- Water
- Extended Buffer Area
- L2 200 Foot Buffer Area
- L3 200 Foot Buffer Area
- Installation

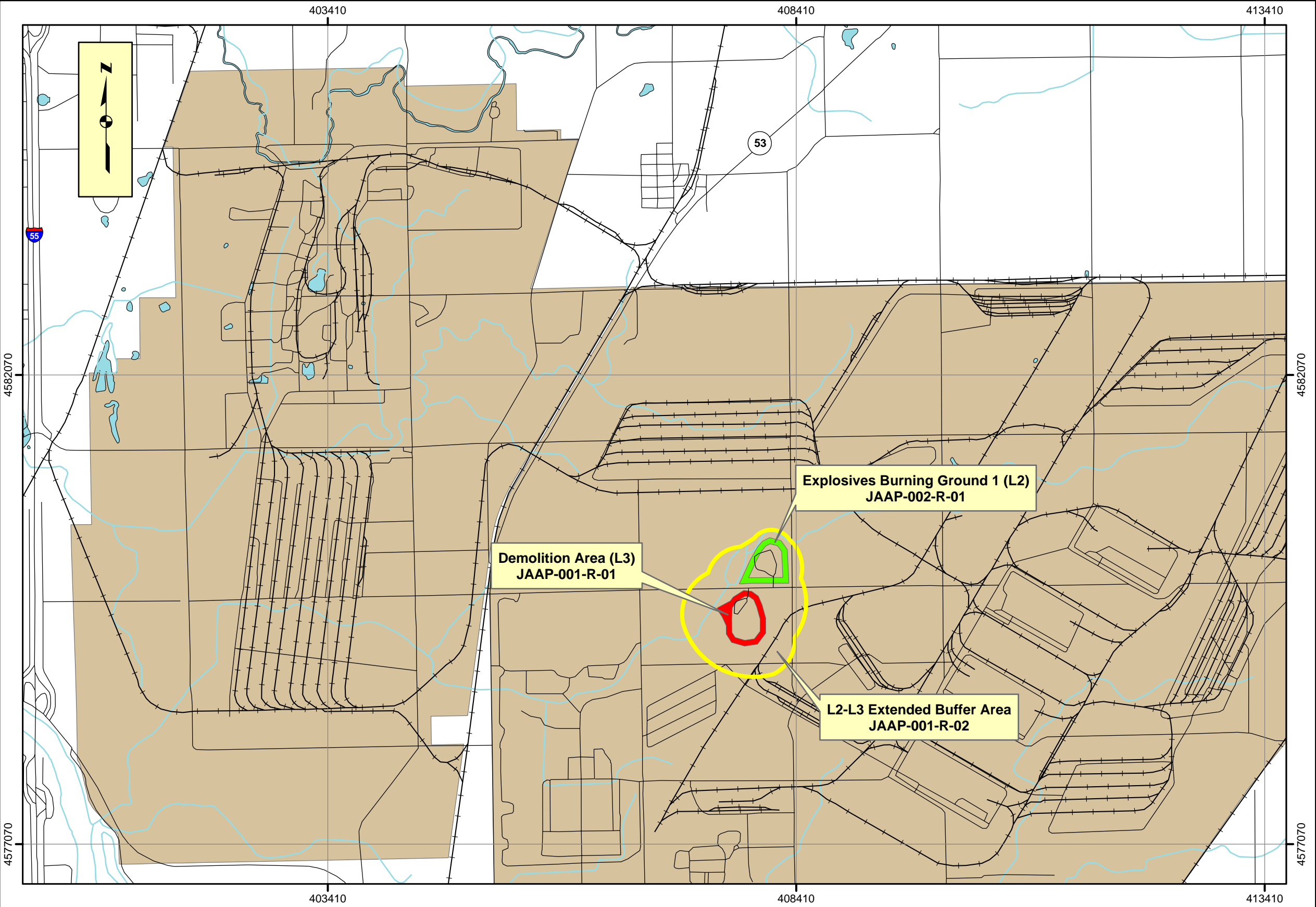
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Edition: Final
Date: February 2009

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Miles



Source: Adapted from SI Report, May 2005.



The first TPP session was held at JOAAP on 15 October 2008. The results of this TPP session dictated the MEC and MC sampling/field activities planned for the installation. Table 2-1 provides a summary of decisions made to address MEC, and Table 2-2 provides a summary of decisions made to address MC. Final Meeting Minutes from the TPP are included in Appendix C.

Table 2-1: Summary of MEC TPP Decisions

MRS	MEC SI Activities	
	Activity	Purpose
L2-L3 Extended Buffer Area	Instrument-assisted surface sweep / visual survey of approximately 40 acres (10% of site acreage)	To support MEC NFA or RI/FS determination. If no MEC are identified, the site qualifies for NFA. If MEC are encountered, the site will move to an RI/FS. The site will be surveyed in a manner to better define a boundary of the extent of MEC on the MRS.

Table 2-2: Summary of MC TPP Decisions

MRS	MC SI Activities	
	Activity	Purpose
L2-L3 Extended Buffer Area	No field work will be completed in association with MC. Samples were previously collected in this area, which then received an NFA designation with regard to soil during the 2004 Record of Decision. Data previously collected will be referenced.	Data collected during previous investigations will be used to complete the MRSP.

2.3 SI ADDENDUM FIELD WORK

The primary goal of this project is to determine the presence or absence of MEC and MC that may pose a threat to human health and/or the environment. This potential MEC and MC may remain from activities conducted by the DoD during operation of the Explosive Burning Ground I (L2) and Demolition Area (L3).

During the instrument-assisted visual survey, the team will be led by qualified personnel (UXOSO) to inspect the surface for MEC and provide anomaly avoidance support. As was

agreed upon by stakeholders during the 15 October 2008 TPP meeting, sampling for MC will not be performed and prior analytical data from the 2004 Record of Decision (ROD) will be used to support the SI Addendum effort. The field work will take place on or about 1–6 March 2009, providing snow cover is not present on the site at this time. In the case snow is covering the ground, field work will take place as soon as conditions allow.

2.4 PROJECT DELIVERABLES

In addition to this Work Plan, Malcolm Pirnie will develop and submit an SI Addendum Report, which will include the:

- Draft Final CSM and
- results of instrument-assisted site walk and visual surveys.

As previously indicated, no MC data will be collected during the field work effort.

3 TECHNICAL APPROACH

The instrument-assisted visual survey objective for the SI Addendum is to collect sufficient data to confirm the presence/absence of MEC to include MEC classified as ICM within the areas of concern. Historical records indicate that ICM have been disposed of at L2 and L3 in the past. As required by the Department of the Army, an ICM waiver was requested and approved in February 2001 to support past MMRP investigation and clearance efforts at the sites (Appendix E). An RA was conducted in 2007 at L2 and L3 to clear a 200-foot buffer area around each site. During this effort, MD from Bomb Live Unit (BLU) 26 and BLU 32 ICM was located; however, no live ICM were discovered. Based on the findings of the 2007 RA and that the SI Addendum field work will be conducted outside of the boundary for the L2 and L3 sites, it has been determined, after having discussions with USACE Baltimore District OE Safety personnel, that an ICM waiver is not required in support of this SI field work.

3.1 MEC ACTIVITIES

This portion of the field work should be such that exclusion zone impacts, engineering control requirements, clearing and grubbing efforts, and MEC disposal activities are not required. The field activities for the SI Addendum are not intended to confirm all types of MEC present, determine MEC density, or define the exact limits of the MEC impacts. As MEC have been previously confirmed at the MRS, the field activities for this SI Addendum will be used to further delineate the extents of the site boundary to better ascertain the potential acreage requiring further investigation. The areas over which MEC activities will be conducted are discussed in detail in Section 4.

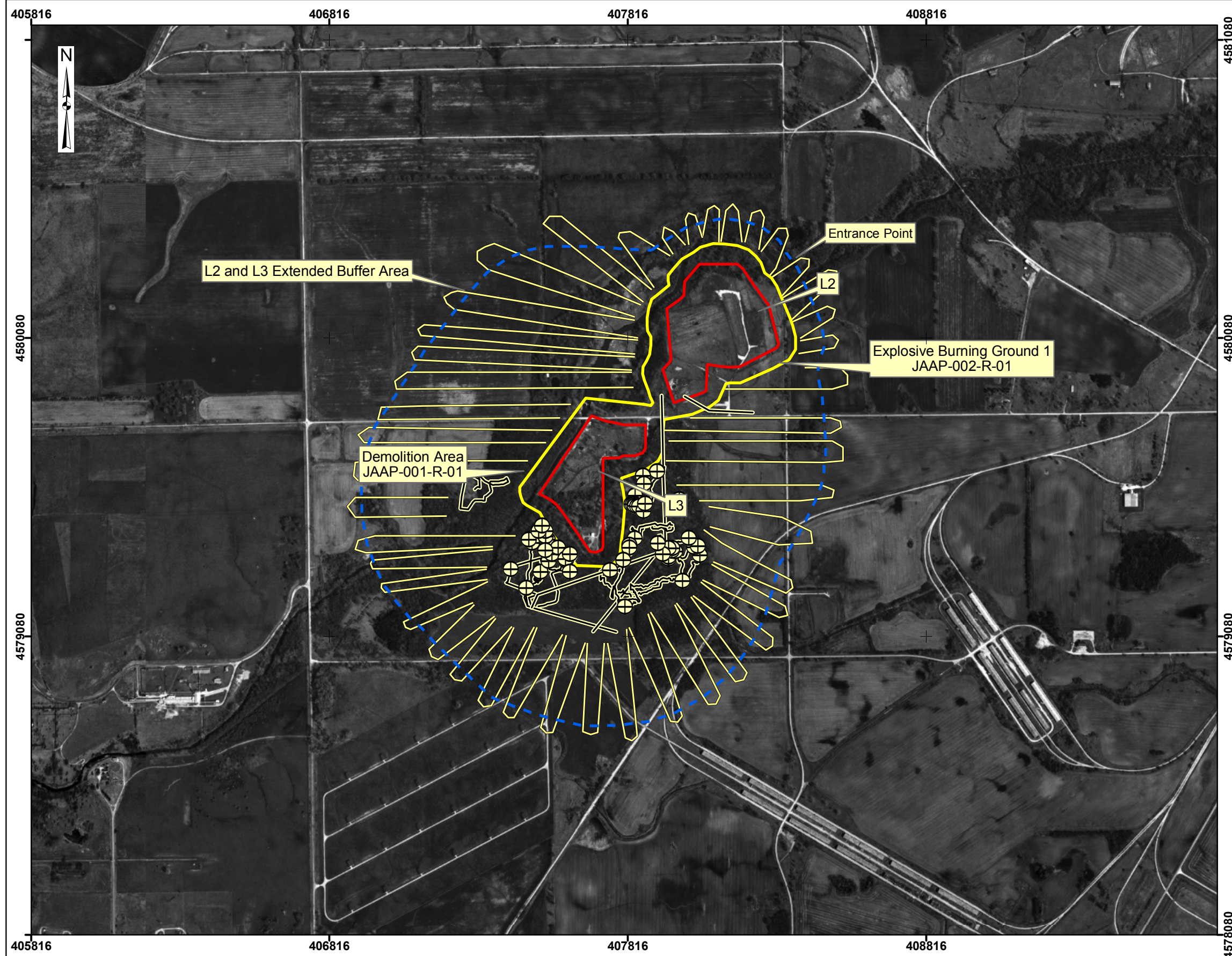
MEC discovered during field activities will not be removed, disturbed, or otherwise compromised. The field team will make a photographic record of the MEC item and make field notes indicating the location of the item, its conditions, and any other pertinent information. The location of the MEC item will be recorded with Global Positioning System (GPS) equipment. This information will be recorded on the Malcolm Pirnie MEC / Multiple Anomaly Form (Appendix C). The field crew will notify the JOAAP Commander's Representative and USACE,

Baltimore District PM of any MEC items encountered at the completion of field activities each day. In the event an ICM is located, visual survey operations inside the L2-L3 Extended Buffer Area will be suspended. The ICM will be reported immediately to the JOAAP Commander's Representative and the USACE, Baltimore District PM, and a decision will be made to determine the path forward.

3.1.1 Instrument-Assisted Visual Survey

A limited instrument-assisted visual survey of the suspected MEC site (listed in Section 4) will be performed to locate and document MEC found during the site walk. Field team personnel will conduct the visual survey while being escorted by an UXOSO. This activity will be limited to a visual survey to identify materials and/or surface features that provide information on the areas and activities in question.

A white e-series all-metals detector will be used to conduct the limited instrument-assisted visual survey and detect surface MEC (primarily used for MEC safety avoidance). Random transects in a spoke-and-wheel manner will be used with transects spaced roughly 150 feet apart (Figure 3-1) and will extend from the outside boundary of the 200-foot 2007 RA to the Extended Buffer Area in both the L2 and L3 areas. In areas where the Army previously conducted meandering path transects in 2007 (Figure 3-2), the random survey transects will be located at the outer boundary of the Army transect and extend to the estimated L2-L3 Extended Buffer Area boundary, or until MEC is no longer located, whichever is farther. This method will be used to conduct visual survey transects within the L2-L3 Extended Buffer Area MRS, with transect paths dependent on terrain, vegetation, and site features. The width of each transect will be maintained at 10 feet unless affected by vegetation. In the event a 10-foot-wide path cannot be maintained, the actual width will be recorded in the project field logbook. If ICM are located within the MRS, visual survey operations will be suspended inside the MRS and will be conducted at the perimeter of the site to make determinations if the present boundary is adequate.



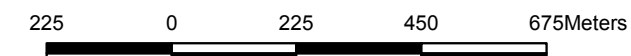
Site Work Plan Addendum Joliet AAP, IL



Figure 3-1
Proposed Site Walk

Legend

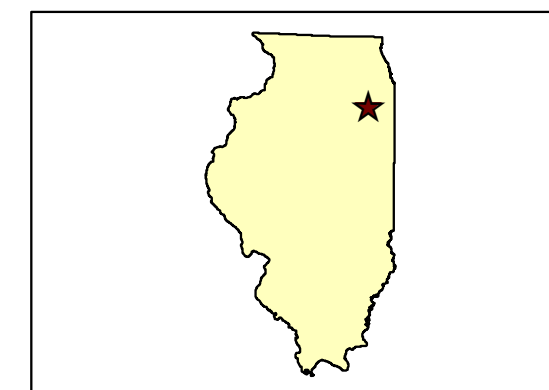
- 2007 Field Survey MEC/MD Discoveries (Army)
- L2, L3 Extended Buffer Area
- L2, L3 Areas
- Explosive Burning Ground and Demolition Area
- Previous Site Walk (Conducted by U.S. Army)
- Transect



Data Source: TerraServer 1M DOQQ

Coordinate System: UTM Zone 16
Datum: WGS 84
Units: Meters

Contract: DACA31-00-D-0043
Edition: Final
Date: February 2009



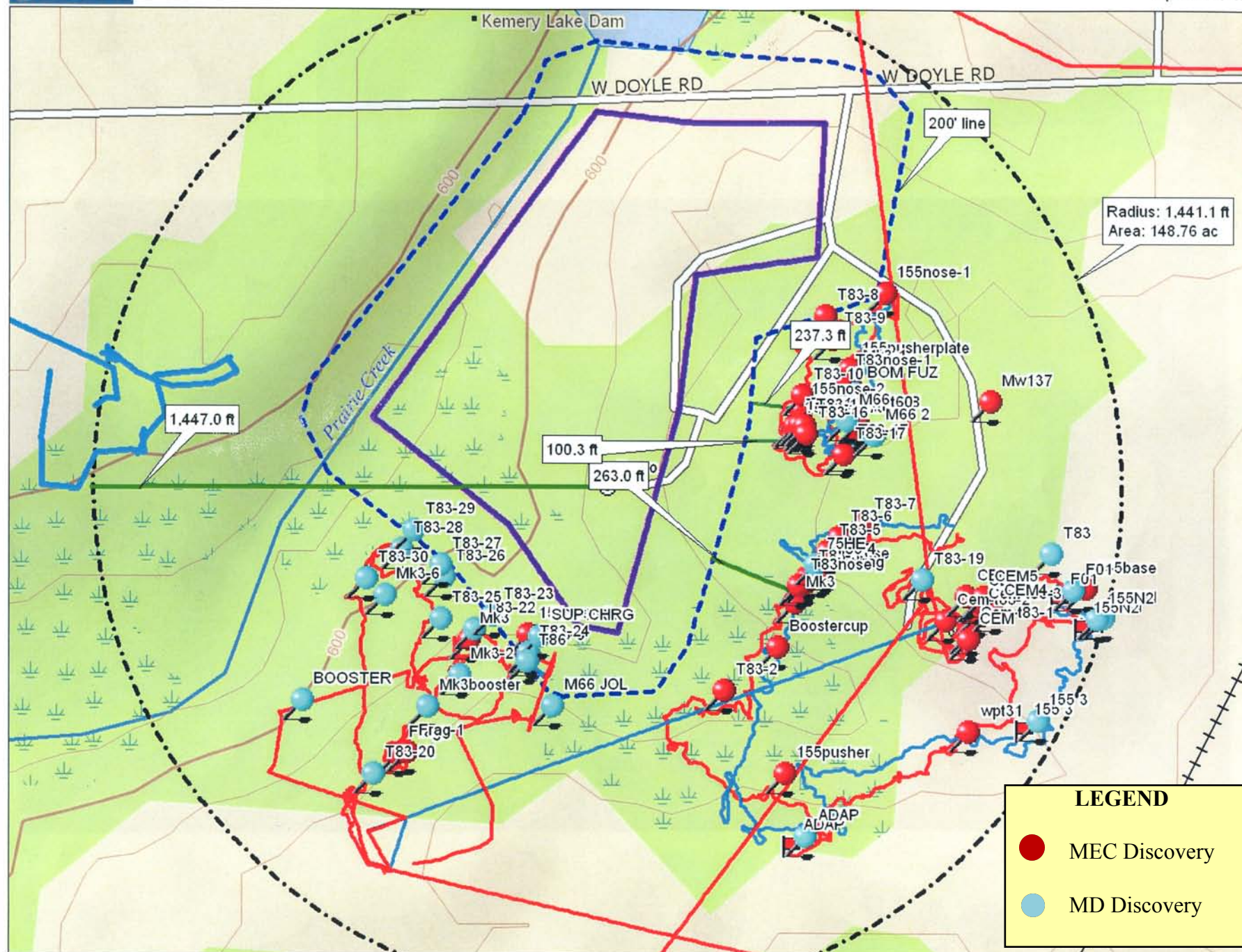


Figure 3-2
Random Transects Surveyed by
USACE in Summer 2007

★
MN (2.7° W)

0 120 240 360 480 600 ft
Data Zoom 14-7

The following steps will be conducted during the instrument-assisted visual survey:

- Prior to entering an area requiring ordnance avoidance, the UXOSO will conduct a tailgate safety brief. This brief will cover emergency procedures, operations, types of suspected MEC that may be encountered during the site visit, and ordnance avoidance procedures.
- The UXOSO will enter the site first and conduct a surface sweep of the path as the survey team follows behind in a single file. The team will identify target areas containing MEC, to include DMM and MD.
- The survey team will observe the area for pits, craters, and unusual holes—these could indicate impact areas, demolition sites, or burial pits. These areas will be documented using the MEC / Multiple Anomaly Discovery Form (Appendix C), the GPS locations will be recorded, and the areas will be photographed.
- If MEC are discovered, the UXOSO will mark the item, GPS coordinates for the item will be recorded, and the ordnance item will be logged as to its description, size, color, and any other distinguishable marks. Pertinent data will be entered on a Malcolm Pirnie MEC / Multiple Anomaly Discovery Form (Appendix C). A digital photograph of the item will be taken, and the photograph number and item description will be noted in the logbook. At no time will the ordnance item be moved or disturbed. An immediate response trigger evaluation described in Section 3.1.2 will be performed. The JOAAP Commander's Representative and USACE, Baltimore District PM will be notified if any MEC item is encountered during field work. After collecting the necessary data, the team will proceed with its survey.
- If an ICM is encountered, an immediate response trigger evaluation described in Section 3.1.2 will be performed. The team will move to the outside of the L2-L3 Extended Buffer Area and proceed with the instrument-assisted visual survey.

The following function check procedures will be used to perform function tests on the equipment used during the instrument-assisted visual survey:

- All metal detectors (i.e., white e-series all-metals detector) will be swept across known selected items within an area outside of the site to demonstrate consistent effectiveness.
- Instruments and equipment used to gather and generate data will be tested with sufficient frequency and in such a manner as to ensure that accuracy and reproducibility of results are consistent with the manufactures' specifications. Instruments or equipment failing to meet the standards will be repaired, recalibrated, or replaced. Replaced instruments or equipment must meet the same specifications for accuracy and precision as the item removed from service.

3.1.2 Triggers for Immediate Response

MEC removals will not be conducted as part of the SI Addendum. However, the field team may encounter MEC, ICM, or MD during site reconnaissance. A UXOSO will accompany the data collection team and provide MEC escort services for all data collection personnel. Any MEC, ICM, and MD encountered will be identified to help characterize the site. Under no circumstances will MEC or ICM be handled, moved, or disturbed during the visual survey. After marking MEC and gathering required data, the visual survey team will continue their survey transect; however, if ICM are located within the MRS, visual survey operations inside the MRS will be suspended immediately and operations will be conducted as discussed in Section 3.1.1.

The SI Addendum field work is not intended to include removal or disposal actions; however, if identified, MEC, ICM, and explosives hazards must be reported and a response decision made by USACE, Baltimore; USAEC; and the installation point of contact (POC). The appropriate POCs for a response decision are referenced in Table 1-3. The need to follow up with additional actions will be evaluated based on the overall threat to human health and the environment. The level of threat is determined by an overall understanding of the situation and its risk, which is based on site-specific data and the factors discussed in Table 3-1.

For the purposes of the SI Addendum, Malcolm Pirnie will immediately report the presence of MEC and the information needed to answer the questions in Table 3-1 for determination of the appropriate action to the USACE, Baltimore PM; USAEC; and the installation POC.

All field work will be of the quality needed to meet the DQOs for the project, as dictated in the QAPP, the TPP Meeting Minutes, and decisions agreed upon after the TPP meeting. The details of the planned MEC visual survey activities are provided in Section 4.

Table 3-1: MEC Factors for Immediate Response Actions

MEC Factor	Status Questions
Accessibility of the MEC	Is it in an area restricted to the public with engineering controls precluding entry, such as fences, security guards, or posted hazards signs? Are the MEC in an area accessible to the public, and does this create an imminent hazard to people or the environment?
Type of MEC	Is the MEC item an ICM? What is the condition, fuzing type, net explosive weight, and specific hazards of the item? Does the MEC item pose an immediate threat?
Site assessment	Do the MEC site conditions require using protective measures, such as tamping, shielding, or focusing of the heat, blast, and shockwave to mitigate the explosive effects? What is the maximum fragmentation range and over-pressure distance of the MEC?
Other considerations	Can the hazard be moved? Can the area within the fragmentation and blast distance withstand a detonation, and are there critical habitats or facilities located nearby?

3.2 UTILITY CLEARANCE

Subsurface sampling will not occur during this SI Addendum; therefore, utility clearance is not needed.

3.3 RIGHT OF ENTRY

In accordance with Engineer Regulation (ER) 405-1-12, a right of entry (ROE) is the authority to conduct a specified act or series of acts upon land not owned or controlled by the federal government without acquiring any estate or interest therein. In cases where an MRS is a transferred property, the land is no longer owned by the Army but by another public or private entity, and the appropriate USACE Real Estate Office will send an ROE form to the property owner. The form will clearly state the intentions of the field activities to be conducted on the property. The form will explain the process for prior notice to be given to the owner before the contractor begins sampling procedures, state the responsibility of the government to furnish copies of sampling and analysis results to the owner, and provide specific limits of comprehensive general liability insurance to be carried by the government.

The ROE does not give the USACE or its contractor the right to perform any follow-on remedial work that might be required. If field results indicate a need for remediation, this would be

discussed with the property owner and the owner would be requested to sign a new ROE form. If at any time the government is unable to obtain an ROE, the contractor shall make the best efforts to complete the requirements of the SOW without entering the property. The ROE for the L2-L3 Extended Buffer is provided in Appendix E.

3.4 GPS SURVEYING

The coordinates of each MEC find will be recorded to document the location. The GPS unit proposed for use is a Trimble GeoExplorer CE, Geo XT handheld unit. Pathfinder Office software will be used to download and post-process the data to achieve sub-meter horizontal accuracy. Field conditions, such as the number of satellites available at the reading time and density of the tree canopy, dictate the amount of time needed to acquire a reading and the accuracy of that reading. Coordinates will be established for each sample location to an accuracy of 1 meter, where possible.

3.5 FIELD EQUIPMENT

A variety of equipment will be used to perform the field activities for this project. Table 3-2 lists the field equipment that will be on site and used.

Table 3-2: Field Equipment

Category	Equipment
H&S	First aid kit, 10-pound fire extinguisher, eye wash solution
Personal protective equipment	Level D protective clothing, safety glasses, leather gloves, head cover, 6" boots
GPS	Trimble GeoExplorer CE, Geo XT Handheld Unit
Schonstedt	Model GA52CX
Digital camera	
Documentation	Daily Quality Control Report (DQCR) forms, field logbook, H&S forms

3.6 HEALTH & SAFETY

The HASP (Appendix A) provides general H&S procedures applicable to field activities to be performed at all installations where MMRP SIs are being conducted by Malcolm Pirnie (for the USACE). The HASP sets forth H&S protocols to be used by Malcolm Pirnie employees and its subcontractors during field activities. All work will be in conformance with the HASP unless formally modified and approved by the Malcolm Pirnie UXOSO and reviewed by the Contracting Officer via a formal record of change. The intent of the HASP is to ensure the H&S of all site personnel, the general public, and the environment. Although it is impossible to eliminate all risks, adherence to the HASP will help minimize incidents and accidents by promoting safety while maintaining productivity. It should be noted that the HASP may include discussions that are not applicable to a specific site since it is intended to encompass all sites.

It is intended that once the HASP is finalized, it will not be modified (except for programmatic changes) and will serve as a programmatic document. Site-specific sampling information and any exceptions or proposed changes to the HASP are addressed and included in the SS-HASP, which is included as Attachment 1 to the HASP. The SS-HASP is not a stand-alone document. The HASP will provide the majority of the H&S information; the SS-HASP simply supplements the information in the HASP by providing for site-specific condition requirements.

4 FIELD ACTIVITIES

The field activities will be completed at the L2-L3 Extended Buffer Area at JOAAP in order to determine the boundary of MEC contamination on the site as agreed upon using the TPP process. As a result of the SI Addendum activities, a further investigation (e.g., RI/FS) is required for the MRS and a refined site boundary will be delineated. A brief site description and the agreed upon MEC/MC field activities are presented below for the MRS.

4.1 L2-L3 EXTENDED BUFFER AREA

4.1.1 Site Description

The L2-L3 Extended Buffer Area is approximately 396 acres and is located outside the boundaries of the L2 and L3 Buffer Zones. This newly established MRS is the result of previous studies and investigations at JOAAP. The 2005 JOAAP SI recommended further investigation of the area extending 200 feet from the boundary of the Explosive Burning Ground (L2) and Demolition Area (L3). Based on this recommendation, an RA was conducted in 2007 in the 200-foot buffer area surrounding both sites. An additional area of concern was identified as a result of findings during the RA, which suggested MEC contamination extends beyond this 200-foot buffer area; the resulting MRS was named the L2-L3 Extended Buffer Area. The MRS currently is undeveloped, but portions are used for agriculture. The planned future use for the site is open space for the U.S. Department of Agriculture (USDA) Midewin National Tallgrass Prairie. Map 2-1 provides an overview of the L2-L3 Extended Buffer Area.

A formal survey of the L2-L3 Extended Buffer Area has not been conducted, but the MEC found at the IRP sites L2 and L3 and their respective MMRP buffer areas are indicative of the potential munitions expected to be found at the L2-L3 Extended Buffer Area.

Known munitions disposed of at the L2 and L3 MRSs are derived from the *Historical Records Review for Other Than Operational Ranges* (USACE, Louisville, 2005), and the HRR Addendum (Malcolm Pirnie, 2008) provides the complete list of MEC items found during the 2007 RA. Some types of these items include:

- blasting caps,
- fuzes,
- boosters,
- bursters,
- bombs,
- bulk explosives,
- medium caliber munitions,
- small arms ammunition,
- landmines and anti-personnel mines,
- large caliber munitions, and
- ICM.

4.1.2 Proposed MEC Activities

MEC Activities: Based on information presented in the HRR, the potential for MEC at the site exists; therefore, an instrument-assisted visual survey will be performed using a white e-series all-metals detector or equivalent for both safety and avoidance purposes, as well as to identify potentially dangerous metallic objects that lie on the surface but are not readily visible to the naked eye (e.g., covered by vegetation). The visual survey team will be directed to visually investigate all detections or ring-offs on the surface as potential MEC items; anomalies determined to be located in the subsurface will not be investigated.

At no time will intrusive work be performed as part of this SOW. The visual survey team, consistent with USACE and DoD Explosives Safety Board guidelines, will consist of UXO sweep personnel with site- and job-specific contractor training (e.g., ordnance recognition, safety precautions, donning and doffing personnel protective equipment) or by team members who are UXO qualified (i.e., graduates of military Explosives Ordnance Disposal School). The visual survey will be conducted under the direct supervision of a UXOSO.

A visual surface sweep of 10% of the approximately 396-acre site (approximately 40 acres) will be conducted to look for MEC on the surface. The visual survey team will walk to survey 10-

foot-wide random spoke and wheel type transects within the L2-L3 Extended Buffer Area. The random transects will be spaced roughly 150 feet apart as indicated in Figure 3-1 and will extend from the outside boundary of the 200-foot 2007 RA to the estimated L2-L3 Extended Buffer Area boundary in both the L2 and L3 areas. In areas where the Army previously conducted meandering path transects in 2007 (Figure 3-2), the random survey transects will be located at the outer boundary of the Army transect and extend to the estimated L2-L3 Extended Buffer Area boundary, or until MEC is no longer located, whichever is farther. The random transects, as depicted in Figure 3-1, are approximate and will be positioned as required in the field to deal with access and topographical issues. SI Addendum field activities are not intended to locate subsurface MEC. A UXOSO will escort field personnel on site at all times.

Pertinent site features (e.g., topographical depressions, landmarks) and visual observations (e.g., MEC, MD, potential target or potential disposal areas) will be recorded using a handheld GPS unit. GPS data from the visual survey will be post-processed, shown graphically as mapped features, and tabulated in an appendix in the SI Addendum Report.

If MEC are discovered, the UXOSO will mark the item, GPS coordinates for the item will be recorded, and the ordnance item will be logged by recording its description, size, weight, color, and any other distinguishable marks. The visual survey team will make a photographic record of the item and take field notes indicating the location of the item, its conditions, and any other pertinent information. This information will be recorded on a Malcolm Pirnie MEC / Multiple Anomaly Discovery Form (Appendix D).

Surface MEC discovered during visual survey activities will not be removed, disturbed, or otherwise compromised. The UXOSO will make notifications as discussed in Section 3.

The goals of the visual survey are to:

- identify surface MEC items or MEC related areas of concern (e.g., ICM, MD, potential MEC disposal areas),
- confirm or refine MEC locations, if any are detected, to ensure any future findings would be located in the established boundary,

- confirm or refine current site boundary, as necessary, to encompass MEC.

As the presence of MEC has been determined through previous activities such as the 2007 RA, the visual survey efforts will focus on further refinement of the MRS boundary.

MC Activities: MC samples will not be collected as part of this SI Addendum. MC sampling data used to support the Record of Decision (ROD) (2004) will be used and compared to previously established remediation goals (RGs) for this effort. Pending results of the MEC survey, should the previous MC results be below the applicable screening standards, the site may be recommended for NFA. If the previous MC results for any of the samples exceed the applicable screening standards, the site may be recommended for an RI/FS. As the presence of MEC has been determined through previous activities at the MRS, the site will be recommended for further investigation at the conclusion of the SI Addendum.

5 SITE-SPECIFIC QUALITY ASSURANCE PROJECT PLAN

The Quality Assurance Project Plan (QAPP) provides general information and standard operating procedures applicable to sampling and analytical activities to be performed at all installations where MMRP SIs are being conducted by Malcolm Pirnie within USACE Baltimore Area of Responsibility. The information includes definitions and generic goals for data quality and minimum requirements for QA/QC samples. The procedures address sampling and decontamination protocols; geophysical investigation; field documentation; sample handling, custody, and shipping; instrument calibration and maintenance; field and laboratory auditing; data reduction, validation, and reporting; corrective action requirements; and QA reporting.

As MC sampling will not be performed in this site inspection, the standard QAPP has been removed as it does not apply to this field effort.

6 FIELD DOCUMENTATION

6.1 FIELD OPERATIONS DOCUMENTATION

Field documentation is of the utmost importance in assuring QC. Field documentation will include DQCRs, MEC / Multiple Anomaly Discovery Sheets, GPS data, photographs, and field logbooks. All field documentation will be completed in indelible ink. Corrections will be made by drawing a single line through the text and legibly writing the correction.

6.2 DATA QUALITY CONTROL REPORT

A Daily Quality Control Report (DQCR) will be completed for each day of field activities. An in-house inspection of these reports will be reviewed as they are generated by field personnel. A sample report is provided in Appendix F.

6.2.1 Daily Quality Control Procedures

Malcolm Pirnie will provide DQCRs to the USACE, Baltimore District PM in the SI Addendum Report. During field investigation activities, DCQR will be completed, dated, and signed by the sampling technician at the end of each work day. Copies will be distributed to the field supervisor on a daily basis. These DCQR shall include, but are not limited to, the following information:

- a. Weather conditions at the time of sampling;
- b. Level of Personal Protective Equipment;
- c. Field instrument measurements and calibrations; and
- d. Any deviations from the Work Plan, problems identified, and corrective actions taken.

6.3 MMRP Databases

Analytical results will require input in the Environmental Restoration Information System (ERIS) Database. The data from MMRP investigations will be maintained in the database which includes the following information for each sample collected: sample ID; preservation; date

sampled; media type; site location; chemical analyses; and validation review. The format requirements for the ERIS database are located in Appendix G of this Work Plan.

If the ERIS database format is revised during the MMRP investigations, the newly established database format shall be included as an appendix to the Work Plan.

6.4 FIELD LOGBOOKS

Field notes regarding all field activities will be kept in a bound notebook with prenumbered pages. Indelible ink will be used for all entries. The field notes will be filled out while the field work is taking place and will include all of the information reported on the DQCR forms.

6.5 MEC / MULTIPLE ANOMALY DISCOVERY FORM

A Malcolm Pirnie MEC / Multiple Anomaly Discovery Form will be completed in indelible ink for each MEC item found. A blank form is provided in Appendix C.

7 REFERENCES

Analytical Laboratory Services, Inc. Standard Operating Procedures, 09-8330S, Revision 1 and 1B-833 Revision 3.

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Department of Defense. January 2006. *Quality Systems Manual for Environmental Laboratories*, Version 3.

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United States Army Corps of Engineers, Louisville District. February 2005. *Historical Records Review for Other Than Operational Ranges at JOAAP*.

United States Army Engineering and Support Center, Huntsville, Alabama. October 1999. *Engineering Evaluation/Cost Analysis Site L2, L3, L11, L16, L21, and L34, Joliet Army Ammunition Plant*.

Appendix A: Health and Safety Plan

FINAL

**SI HEALTH AND SAFETY PLAN
JOLIET ARMY AMMUNITION PLANT
WILMINGTON, ILLINOIS**

FEBRUARY 2009

Prepared for:

U.S. ARMY CORPS OF ENGINEERS, BALTIMORE DISTRICT
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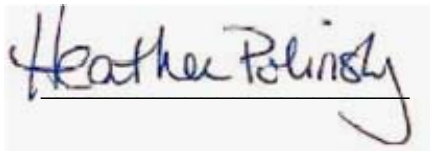
FINAL

**SI HEALTH AND SAFETY PLAN
JOLIET ARMY AMMUNITION PLANT
WILMINGTON, ILLINOIS**

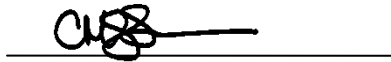
DoD Contract Number:

W912DR-05-D-0004

Reviewed and Approved by:

A handwritten signature in blue ink that reads "Heather Polinsky". The signature is written over a horizontal line.

Heather Polinsky, Vice President
Program Officer
Malcolm Pirnie, Inc.

A handwritten signature in black ink that reads "Courtney Ingersoll". The signature is written over a horizontal line.

Courtney Ingersoll
Project Manager
Malcolm Pirnie, Inc.

Malcolm Pirnie, Inc. prepared this report at the direction of the U.S. Army Corps of Engineers (USACE). This document should be used only with the approval of the USACE. This report is based, in part, on information provided in other documents and is subject to the limitations and qualifications presented in the referenced documents.

FEBRUARY 2009

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ACRONYMS

Acronym	Definition
ANSI	American National Standards Institute
CIH	Certified Industrial Hygienist
EC	Emergency Coordinator
EOD	Explosive Ordnance Disposal
FPM	Field Project Manager
FSP	Field Sampling Plan
HSD	Health and Safety Director
MC	Munitions Constituents
MEC	Munitions and Explosives of Concern
MMRP	Military Munitions Restoration Program
MPPEH	Material Potentially Presenting an Explosive Hazard
MSDS	Material Safety Data Sheet
OSHA	Occupational Safety and Health Administration
PM	Project Manager
PPE	Personal Protective Equipment
RCRA	Resource Conservation and Recovery Act
ROC	Record of Changes
SI	Site Inspection
SSO	Site Safety Officer
U.S.	United States
UXO	Unexploded Ordnance
UXOSO	UXO Health and Safety Officer

1.0 INTRODUCTION

1.1 Scope

The Malcolm Pirnie, Inc. (Malcolm Pirnie) Health and Safety Plan (HASP) has been developed for conducting Site Inspections (SI), at sites having a potential for munitions and explosives of concern (MEC) and/or munitions constituents (MC). This plan sets forth health and safety protocols to be used by Malcolm Pirnie employees and its subcontractors during field activities under contract number DACA31-00-D-0043. All work conducted under this contract will be in conformance with this plan unless formally modified and approved by the Malcolm Pirnie UXO Health and Safety Officer (UXOSO) and reviewed by the Contracting Officer via a formal record of change. The intent of this plan is to ensure the health and safety of all site personnel, the general public and the environment. Although it is impossible to eliminate all risks, adherence to this plan will help minimize incidents and accidents by promoting safety while maintaining productivity.

1.2 HASP Acceptance

This HASP and supporting documents will be provided at each site considered for a SI. Site employees and official visitors will be provided with a copy of this plan for review and are responsible for reading, understanding, and signing the acceptance page found in Attachment 1. In addition, an Installation Specific Health and Safety Addendum will be included as the installation-specific hazards are identified, which will be part of the daily safety briefing. The UXOSO and potentially the Certified Industrial Hygienist (CIH) will provide an installation-specific orientation for site workers and visitors. The Site Safety Tailgate Meeting Form, enclosed at the end of this report, will be completed for each orientation. No personnel will be required to perform any activity at the site they believe will endanger their health and safety or that of others.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITY

2.1 Project Organization of Safety Personnel

This program will be accomplished under the direction of the individuals identified below (or alternates) in accordance with the responsibilities assigned by their respective organizations. Specific personnel to fill these positions are included in the Site Specific HASP.

Title	Organization	Function
Corporate Health and Safety Director (HSD)	Malcolm Pirnie	Responsible to the President on all matters related to the health and safety of all Malcolm Pirnie employees and its subcontractors. Has final approval authority on HASPs and modifications recommended by the Field Project Manager (FPM).
Field Project Manager	Malcolm Pirnie	Manages all on-site activities and responsible for maintaining a healthy work environment.
Unexploded Ordnance Health and Safety Officer (UXOSO) ¹	Malcolm Pirnie	Works closely with the FPM and HSD and assists with all on-site activities. Responsible for all safety related to MEC and MC. Provides the daily tailgate safety brief, site orientation, and safe escort of non-UXO personnel.

2.2 Safety Responsibilities of Personnel

All Malcolm Pirnie and subcontracted personnel are responsible for compliance with this HASP. All on-site field personnel are expected to perform only those tasks they believe can be done safely and for which they have been adequately trained. They are responsible for taking all reasonable precautions to prevent injury to themselves and to their fellow employees; for being alert to potentially harmful situations; and for immediately reporting any accidents, near misses, and/or unsafe conditions to the HSD and UXOSO or designated field representative. Specific safety responsibilities of the safety staff are described below.

¹ Also referred to as the Site Safety Officer.

Corporate Health and Safety Director (HSD)

The HSD is responsible for development and implementation of the Programmatic HASP and for the health and safety of Malcolm Pirnie personnel assigned to the field investigation. The HSD will review and approve the HASP. Other duties of the HSD include:

- Initiating actions to provide any required initial installation-specific training;
- Being available for consult by telephone for the full duration of site activities;
- Being available to conduct on-site audits as necessary to observe the effectiveness of the HASP;
- Being available for emergencies;
- Providing on-site consultation as necessary to verify that the HASP is fully implemented;
- Being available for consultation with the FPM and the UXOSO, and the Contracting Officer regarding any modifications to the Site Specific HASP;
- Being available for consultation with the FPM to evaluate changing site conditions and to recommend changes to engineering controls, work practices and personal protective equipment (PPE);
- Being available for review of accident reports and results of daily inspections; and
- Serving as a member of the quality control staff.

Field Project Manager (FPM) – The FPM serves as the Project Manager and has responsibility and authority for directing field activities without exposing or endangering site personnel or the public. The FPM enforces safe work practices, removes unfit or unqualified personnel/visitors from the site, and verifies that machinery and mechanized equipment brought to the site have been certified safe to operate. He/she works closely with the UXOSO, and they both share emergency coordinator activities with the facility and assist with accident and incident investigations. The FPM assigns field tasks only to those on-site personnel who have received adequate instruction and training. He ensures that all site personnel understand their respective safety roles, responsibilities and recommends changes in the HASP if required due to changing site conditions.

UXO Health and Safety Officer (UXOSO) – The UXOSO is responsible for supervising all on-site MEC activities and has final authority on field activities involving MEC. She/he may

also assist the FPM with general site safety matters. Duties include examining the support zones, work zones, and material potentially presenting an explosive hazard (MPPEH) for potential live ordnance; providing MEC orientation and safe escort for site personnel. He or she is also responsible for certifying that all materials are positively identified, if this can be accomplished safely, and to ensure that the area around a MEC is marked.

The UXOSO will assist other team members in interpreting and documenting health and safety related data relevant to work activities at the site. As site data are obtained and evaluated, the UXOSO may modify this HASP with approval of the HSD. The levels of personnel protection outlined in this plan may be upgraded based on such information. The levels of personal protection outlined in this plan cannot be downgraded without the approval of the HSD. The UXOSO or designee will also conduct regular on-site briefings pertaining to health and safety requirements of the project.

Both the FPM and the UXOSO report to the HSD, and they have the responsibility and the authority to develop, implement, and verify compliance with the site HASP. These persons advise on all matters related to health and safety and have the authority to stop all work if conditions are judged to be hazardous to on-site personnel or the public. The UXOSO provides the support to the FPM in the event of an emergency. The UXOSO is responsible for implementing the emergency response plan, supporting responding emergency services, and coordinating with the facility contact. He/she is responsible for conducting accident and near-miss investigations and for submitting the Accident Reports and First Aid Incident Report to the HSD within 24 hours of a significant incident or within eight hours of a serious incident. Additional duties of the FPM and the UXOSO are:

- Verifying personnel training and medical certifications;
- Regularly inspecting the site for hazardous conditions;
- Conducting and reporting accident and near-miss investigations;

- Documenting that all field personnel have read and understand the requirements set forth in the HASP, and verifying that these requirements are upheld during on-site work activities;
- Conducting daily tailgate health and safety meetings for all participants before starting a specific task;
- Arranging for and providing job safety training, as required;
- Establishing work zones, evacuation routes, and assembly areas;
- Determining whether to maintain or modify levels of protection provided in the HASP based on site conditions and monitoring data;
- Ensuring that protective clothing and equipment are properly selected, used, stored, and maintained;
- Maintaining a first aid kit and availability of a vehicle in the case of an emergency;
- Maintaining contact with the facility in the event of an imminent MEC hazard;
- Ensuring that the FPM and Project Manager are informed of any situations out of the norm that may be of concern regarding the investigation, audits, and/or reports; and
- Clearing the area prior to collection of environmental media samples.

2.3 Stop Work Authority

All employees have the right to work in a safe and healthful environment that is free from recognized hazards. Conditions or situations that are unsafe must be reported immediately to the FPM and/or the UXOSO. The FPM will evaluate the situation, in consultation with the UXOSO and the HSD, and determine which appropriate actions need to be taken to ensure a safe working environment. Work will be continued only after these actions have been implemented.

2.4 Required On-Site Documents

The following information (some of which will be included in the site specific HASP Addendum) must be available at the project site:

- Installation-specific HASP
- Emergency notifications, services, points of contact phone list and procedures
- Site Evacuation Plan (including routes)
- Site Hospital Route Map
- Material Safety Data Sheets (MSDSs), if needed
- Applicable Occupational Safety and Health Administration (OSHA) records (OSHA Forms 300 and 301)

2.5 Project Logs, Records, and Reports

The FPM (or designee) must carefully document the implementation of this HASP by maintaining the installation-specific Field Binder. The binder will contain the following documents, which shall be available for review by the facility or appropriate OSHA representative:

- Daily Employee Visitor Roster
- Daily Tailgate Safety Meeting Reports
- Supervisor's Report of Injury or Illness
- First Aid Incident Report
- Project Accident First Aid Log
- Incident Reports (for unanticipated MEC discovery, environmental incidents, equipment damage, evacuations, and near-miss events)
- Record of Changes (ROCs) to this HASP
- Signed Acceptance of HASP Form (signed by all routine on-site personnel).

3.0 SAFETY AND HEALTH RISK ANALYSIS

3.1 Project Tasks

The site specific HASP Addendum will address any additional project tasks not covered in Section 1.

3.2 Radiological Hazards

Given the extent to which radioactive material has been used in industry and government, there is always a possibility of encountering other sources of radioactive contamination. It is not anticipated that any radiological hazards will be encountered during this work. However, if any radiological contamination is suspected, work will cease immediately and both the FPM and the UXOSO will be contacted.

Radium nuclear decay emits ionizing radiation in the form of alpha particles. Alpha particles can travel a few inches in the air, but cannot penetrate the skin or other barrier. However, they can be particularly damaging if ingested or inhaled. The potential routes of entry include inhalation of contaminated dusts and ingestion of contaminated dusts from hand-to-mouth contact due to poor personal hygiene.

These techniques are employed to protect workers from ionizing radiation:

- Avoid any suspected radiation emitting devices and contact the FPM immediately.
- Limit time of exposure to radioactive materials.
- Specify safe working distances from sources.
- Shield against radioactive particles using barriers and/or PPE.

3.3 Explosives and Ordnance Hazards

Physical hazards associated with explosive compounds and MEC are anticipated at the ranges. These include reactive/explosive residues from spotting charges or phosphoric fillers associated

with practice munitions and/or MEC. For the purposes of this HASP, all explosives are termed MEC. An UXO Technician(s) will first perform a visual MEC survey of the areas that need to be accessed by walking the site and closely observing and marking any surface MEC hazards. If non-MEC trained personnel must access an area, a safe access corridor will first be marked with flagging or pin flags or a UXO Technician will provide escort for any non-MEC trained personnel. It is critical that all personnel be briefed on both the initial identification of MEC and the steps to take if potential MEC is encountered. Specific hazards will be discussed in the tailgate safety briefing and included in the installation-specific safety orientation. MEC hazards, precautions and procedures are discussed in the Malcolm Pirnie Standard Operating Procedures for Sites Contaminated with MEC.

3.4 MEC Awareness Training

The work being conducted for the SI of ranges does not involve MEC operations as they relate to the excavation, moving and disposal of MEC. This is solely an **Anomaly Avoidance** project; no one under any circumstances shall touch or move any MEC or items that may resemble MEC. All personnel that are not UXO Trained Technicians will remain only in those areas that are marked as safe for access or will be under escort by a trained UXO Technician. At the initial on-site training, all personnel will receive an installation-specific MEC briefing by either a Malcolm Pirnie UXO Technician or Military Explosive Ordnance Disposal (EOD) Unit before beginning any site work. The briefing will include the following:

- Type of ordnance and/or explosive items that have been found in the past;
- Number of items that have been found at the project site and in the surrounding area;
- Telephone numbers to activate the MEC/EOD team;
- Safe refuge areas that will be used to retreat from the explosive areas (The safety areas are established based on the size of the explosive item encountered to ensure that no fragmentation reaches that area);
- Specific steps to take if a worker encounters MEC (Additional MEC safety precautions and safe work practices are described in the Malcolm Pirnie Anomaly Avoidance Standard Operating Procedure)

Step 1: Make NO attempt to touch, move, uncover, recover, or disturb the item that has been found.

Step 2: Call out to the UXOSO on-site. Do not make any quick moves. Wait for the MEC supervisor and point to identify the object. Then slowly move away from the object by retracing your footprints until you are again on a normally used path. Go immediately to the safe area and alert the team of the situation.

Step 3: The UXOSO will ensure that others in the immediate area are alerted to the possible MEC and advise them to wait in a safe area until the item is inspected and clearly marked.

Step 4: No MEC will be moved or repositioned unless requested and authorized by the Contracting Officer. The UXOSO will notify the facility of the location, type, and condition of the item.

Step 5: The UXOSO will photograph (if possible) and document the item in the daily log.

Specific requirements while working in the area include the following:

- Entry to the area is restricted to daylight hours only;
- Vehicles must remain on roadways, designated jeep trails, or areas cleared by the MEC personnel;
- Vehicle must be positioned pointing out of the site with keys in the ignition in the event of an emergency;
- Personnel must remain in groups of two or more and remain within arms length of their partners;
- Personnel must maintain clear communications with MEC personnel and have a working knowledge of radio procedures;
- DO NOT transmit on the radio when within 35 feet of any ordnance item;

3.5 General Physical/Biological Hazards

Anticipated physical/biological hazards include:

- Heat stress (high ambient temperature);
- Noise;
- Slip, Trip and Fall;
- Equipment Operation;
- Electrical;
- Utility avoidance (overhead and underground);
- Falling objects; and
- Biological hazards.

3.5.1 Heat Stress

Exposure monitoring for heat stress is described in Section 6.2.

3.5.2 Noise

OSHA requires the use of hearing protection by all employees when noise levels exceed 85 decibels. This limit may be exceeded on or near heavy equipment. A sound level meter, operating in the dBA slow response mode, will be used to monitor noise levels when personnel are working near heavy equipment. Site workers will wear hearing protection when sustained noise levels exceed 85 decibels. In addition, all Malcolm Pirnie personnel must undergo initial employment, annual, and employment termination examinations, during which a hearing test is conducted.

3.5.3 Slip, Trip and Fall Hazards

Ground irregularities due to topography or protruding materials (e.g., nails in boards, broken glass) may pose a fall, slip or trip hazard to workers. Leather shoes with puncture proof inserts will be worn by personnel to protect against sharp objects which may be protruding from the surface or when using heavy equipment. There are potential hazards from the presence of wet areas, puddles, oil and grease, debris, loose or sandy soils, or other obstructions that may be within the passageways or walkways. Field personnel will be briefed by the UXOSO each morning on the location and type of obvious hazards in the work areas. Site workers are to take care in areas where ground irregularities or protruding objects exist and may not be observed due to vegetation.

3.6 Equipment Operation

To prevent entrainment in moving machinery, Malcolm Pirnie employees will maintain a safe distance from heavy machinery. Malcolm Pirnie employees will remain outside the swing radius of heavy equipment. The UXOSO or designee will remind all site workers each morning about the hazards of moving equipment. Subcontractors will place a worker near moving heavy equipment to guide the operator and warn others.

3.6.1 Utility Avoidance (Overhead and Underground)

Underground utilities may pose an electrocution, explosion, or other hazard during activities. The location of underground utilities will be determined prior to intrusive activities. Utility companies and other responsible authorities will be contacted to locate and mark the locations. The Illinois organization JULIE (800-892-0123) will be contacted if utility clearance is required.

On commercial or industrial properties where underground utilities are expected and public utility companies may not have information on buried utilities, a Level 2 survey will be conducted to locate all above ground and below ground utilities. A Level 2 survey will consist of the use of remote sensing devices (e.g., electrical resistivity, ground penetrating radar, and magnetometer).

3.6.2 Electrical

Electrical storms (thunderstorms) may pose an electrocution hazard. During thunderstorms, all heavy equipment will be shut down, drilling activities will be terminated, and all personnel on-site will take refuge in buildings.

All electrical equipment, power tools, and extension lighting used on this site will be low voltage or protected by ground fault circuit interrupters.

3.6.3 Falling Objects

If there is a danger of falling objects on a property, the entire area inside the exclusion zone will be a hard hat area. Hard hats will also be worn within 50 feet of activities posing an overhead hazard.

3.6.4 Biological Hazards

Persons working on-site should be aware of the presence of biological hazards, including snakes, poisonous plants and poisonous insects. Non-poisonous snakes and poisonous snakes may be present. With the exception of some rare species of poisonous snakes, snakes will not attack

unless provoked. All snakes encountered should be avoided. If a snake is discovered, the UXOSO should be immediately informed of the snake's location, size and type, if known. In most cases, only a brief interruption of work will be necessary to allow the snake to vacate the work area on its own.

Poison ivy is a climbing plant with ternate leaves (arranged in threes) and white berries. Poison oak is similar to poison ivy, but its leaves appear oak-like in form. The leaves of these poisonous plants produce irritating oil causing an intensely itchy skin rash and characteristic bullous lesions. These plants are to be avoided.

Working in tall grass, especially in or at the edge of wooded areas, increases the potential for ticks to bite workers. Ticks can be particularly numerous in the spring and fall. Ticks are vectors of many different diseases including Rocky Mountain spotted fever, Q fever, tularemia, Colorado tick fever and Lyme disease. Ticks attach to the skin and intravenously feed on blood, creating an opportunity for disease transmission. Covering exposed areas of the body and using insect repellent containing N,N-diethyl-m-toluamide (DEET) help prevent tick bites. Periodically during the workday, employees should inspect themselves for the presence of ticks.

If a tick is discovered, the following procedure should be used to remove it:

- Do not try to detach a tick with your bare fingers; bacteria from a crushed tick may be able to penetrate even unbroken skin. Fine-tipped tweezers should be used.
- Grip the tick as close to your skin as possible and gently pull it straight away from you until it releases its hold.
- Do not twist the tick as you pull and do not squeeze its body. That may actually inject bacteria into your skin.
- Thoroughly wash your hands and the bite areas with soap and water. Then apply an antiseptic to the bite area.
- Save the tick in a small container with the date, the body location of the bite and where you think the tick came from.
- Notify the UXOSO of any tick bites as soon as possible.

3.6.5 Trench Collapse or Cave-In

When working on sites that contain MEC, it is possible to encounter a camouflet. A camouflet is an underground cavity that is formed when an explosive ordnance penetrates the earth's surface to a depth where the force of the explosion is not enough to rupture the surface. The atmosphere of the cavity is filled with carbon dioxide as well as other gasses that will not sustain life. There is a potential for a cave-in when sufficient pressure is applied to the surface.

Whenever possible, workers shall not enter trenches or test pits for any reason. If sampling is necessary, it shall be performed using remote equipment or devices (e.g., backhoe buckets, shovels, or equivalent).

If entry is required at depths greater than four feet, use OSHA protective systems (such as sloping, benching, shoring), a competent person to inspect the trench prior to entry, emergency retrieval systems, safe ladders, and a confined space entry permit, where required, to ensure safe atmospheres.

All simple slopes in excavations greater than 20 feet shall have a maximum allowable slope of 1 1/2:1 Horizontal: Vertical or 34°, as measured from the horizontal.

Store excavated materials/spoils greater than two feet from the edge of excavation and/or have retaining devices.

Properly sign and barricade all trenches/excavations to restrict unauthorized pedestrian and vehicular traffic.

As feasible, back-fill trenches upon completion of work. Do not leave open trenches unattended unless covered by steel traffic plates.

3.7 Task-Specific Hazards and Control Measures

A summarized activity hazard analysis will be prepared for all site-specific tasks and included in the installation-specific HASP in Attachment 1. The analysis will include a description of the hazards and the mitigating or control measures required to prevent accidents. New activities or tasks will require a new, written hazard analysis prior to conducting the task.

4.0 HEALTH AND SAFETY ORIENTATION TRAINING

Malcolm Pirnie and subcontractor personnel involved with the investigation activities are required to have completed the 40-hour hazardous materials health and safety training as specified in 29 CFR 1910.120. This training, designed to orient personnel potentially exposed to hazardous substances, health hazards, or safety hazards, includes the following:

- Safety and health risk analysis;
- Use of PPE;
- Work practices by which the employee can minimize risks from hazards;
- Safe use of engineering controls and equipment;
- Medical surveillance requirements, including recognition of symptoms and signs which might indicate overexposure to hazards;
- Procedures for environmental monitoring, site control and decontamination;
- Emergency response plans;
- Introductory Radiological Worker Training;
- Chain-of-command;
- MEC familiarization training;
- Hazard Communication Program, including installation-specific MSDSs; and
- How to respond to media inquiries.

All personnel will also have proof of attendance at an annual eight-hour Health and Safety refresher course if their 40-hour course was completed more than a year prior to the start of field activities.

A MEC orientation program (refer to Section 5.1) will be presented to all field personnel before any work begins. Hazardous work permits, developed for this investigation, are presented in Attachment 1.

"Tailgate" or "toolbox" safety meetings will be conducted each morning by the UXOSO for all phases of work during which all field teams will be provided with a daily work order that will include a checklist with utility clearance and known conditions on the property. Topics of discussion will include work tasks and associated hazards, work zones and designated PPE,

emergency procedures, evacuation routes, and prior safety concerns. These meetings must be documented on the prescribed forms.

4.1 Specialized Training

Malcolm Pirnie, subcontractor, and other field personnel are to be knowledgeable in the particular hazards that may be encountered during this project and familiar with safe operating procedures. This will be accomplished through the review of this HASP, specialized training prior to the commencement of the field work, an audit of field activities and safety meetings during the program, as discussed below.

Field personnel should have a minimum of three days of actual field experience under a skilled supervisor and be familiar with emergency response procedures outlined in this HASP. UXOSO and all supervisory personnel will have additional training, including cardiopulmonary resuscitation (CPR), First Aid, and eight-hour Hazardous Waste Operations and Emergency Response Supervisor training. On site, a minimum of two site workers will be CPR and First Aid qualified at all times. Subcontractors will be responsible for ensuring that their employees receive specialized training for their job functions and responsibilities.

4.1.1 Pre-Investigation Health and Safety Briefing

Malcolm Pirnie and subcontractor personnel involved with the project will attend an installation-specific health and safety briefing prior to initiation of the field activities. The topics to be discussed will include:

- Characteristics and potential hazards of contaminants known to be present at the site;
- Personal protective clothing function, donning/doffing, frisking;
- Respirators: selection, use, care;
- Personal hygiene;
- Environmental monitoring;
- Decontamination procedures;
- Site control and work zone designations;
- General safety concepts;

- Emergency recognition and prevention;
- Heat stress;
- Signs and symptoms of over exposure to site specific chemical hazards;
- Hazard communication
- Emergency response plan; and
- Site contingency plans.

4.1.2 Morning Safety Meetings

The UXOSO or designee shall conduct morning safety and health briefings on an as-needed basis. Problems relative to respiratory protection, inclement weather, heat stress, or the interpretation of newly available environmental monitoring data are examples of topics that might be covered during these briefings. An outline report of meetings giving the date, time, attendees, subjects discussed, and instructor shall be maintained. Visitors will be properly oriented to existing site conditions, planned activities, levels of personal protection, and other procedures outlined in this HASP.

4.1.3 Hazard Communication

Malcolm Pirnie has a written hazard communication program which was established to meet the requirements of 29 CFR 1910.1200, and field activities shall be implemented in accordance with that program, as described below.

MSDSs for hazardous chemicals introduced to the site by Malcolm Pirnie and their subcontractors will be present at the site, for review by all on-site personnel. Labels on containers used by Malcolm Pirnie are as originally received (not to be defaced) and are to contain the following information: (1) the identity of the hazardous chemical(s); (2) the appropriate hazard warnings; and (3) the name and address of the chemical manufacturer. If an employee transfers chemicals from a labeled container to a portable container, a label that contains those three items must be affixed to it. If the portable container is intended only for that

employee's immediate use (during the same work shift), the product name only shall be clearly marked on the container. The employee will be responsible for properly emptying, cleaning or disposing of the portable container immediately after use.

As part of the installation-specific health and safety orientation conducted by the UXOSO, a review of our hazard communication program will be included to inform employees of hazardous chemicals to which they may be exposed during field activities. Subcontractors will also attend the hazard communication training session. If the chemical hazard changes or a new chemical hazard is introduced into the area after work begins, additional training will be provided by the UXOSO.

Installation-specific hazard communication training for hazardous chemicals introduced to the site by Malcolm Pirnie will include:

- Properties and hazards (chemical, physical, toxicological) of each hazardous chemical;
- Health hazards, including signs and symptoms of exposure and any medical condition known to be aggravated by exposure;
- Measures employees can take to protect themselves, including: appropriate work practices or methods for proper use and handling, procedures for emergency response, and the proper use and maintenance of PPE, as required;
- Work procedures for employees to follow to protect themselves when cleaning hazardous chemical spills and leaks; and
- Use of the container labeling system and the MSDSs including: where MSDSs are located, how to read and interpret the information on both labels and MSDSs, and how employees may obtain additional hazard communication information;

Installation-specific hazard communications training will also cover hazardous chemicals introduced by other employers and shall emphasize:

- Information about the hazardous chemicals to which Malcolm Pirnie's employees may be exposed;
- An explanation of the labeling system other employers are using;
- Information about the precautionary measures Malcolm Pirnie employees need to take to protect themselves during normal operating conditions and in emergencies; and
- Location of MSDSs for hazardous chemicals brought to the site by other employers.

The UXOSO shall document the training, including the agenda and list of attendees. This subsection of the HASP and the hazard communication training conducted as described above, shall be the mechanism for informing other employers planning to be on-site of hazardous chemicals introduced to the site by Malcolm Pirnie.

5.0 MEDICAL SURVEILLANCE AND EXPOSURE MONITORING

5.1 Medical Surveillance

Malcolm Pirnie personnel who may have potential exposure to hazardous materials will have initial employment, annual, and termination examinations. Medical evaluations will be performed by an approved occupational physician in accordance with Malcolm Pirnie's Medical Monitoring Program. All Malcolm Pirnie field personnel shall be enrolled in Malcolm Pirnie's Medical Monitoring Program, be medically approved to wear respirators, and fit-tested in accordance with OSHA requirements. Subcontractors are also required to meet medical surveillance requirements for this project.

Purpose - The purposes of the medical evaluation are to: 1) determine fitness for duty on hazardous waste sites; and 2) establish baseline data for future reference. Such an evaluation is based upon the employee's occupational and medical history, a comprehensive physical examination, and an evaluation of the ability to work while wearing protective equipment. The medical examinations include an evaluation of the workers' ability to use respiratory protective equipment according to protocol published in 29 CFR 1910.134.

Supplemental Examinations - Supplemental examinations may be performed whenever there is an actual or suspected excessive exposure to chemical contaminants or upon experience of exposure symptoms or following injuries or temperature stress.

5.2 Heat Stress Monitoring

Whenever feasible, the level of protection established for workers will be based upon quantitative determinations of the radiological and chemical agents and physical stresses present in the work environment. It is proposed that work will be conducted during the summer months; therefore, heat exposure is an issue of concern.

Heat stress is probably one of the most common and potentially serious illnesses at hazardous waste sites. The potential for heat stress is dependent on a number of factors, including environmental conditions, clothing, workload, physical conditioning, and age. The effects of heat stress can range from mild symptoms, such as fatigue, irritability, and decreased mobility, to death. The body's response to heat stress includes the following:

Heat Rash: A result of continuous exposure to heat and humidity, heat rash decreases the body's ability to tolerate heat.

Heat Cramps: A result of profuse perspiration with inadequate fluid intake and chemical replacement, heat cramps are signaled by muscle spasms and pain in the abdomen and the extremities.

Heat Exhaustion: A result of increased stress on various organs. The signs of heat exhaustion include shallow breathing; pale, cool, moist skin; profuse sweating; dizziness and lassitude.

Heat Stroke: The most severe form of heat stress, heat stroke must be relieved immediately to prevent severe injury or death. The signs of heat stroke are red, hot, dry skin; no perspiration; nausea; dizziness and confusion; strong, rapid pulse; and coma. The body must be cooled and medical attention sought immediately.

Measures to prevent heat stress include regular work breaks during field activity, regular fluid replenishment, and the availability of shelter (i.e., shaded area). All personnel will be made aware of the symptoms of heat stress. Should one or more symptoms be detected, the affected worker will be assisted to seek shade, drink plenty of fluids, and seek medical attention, if required.

Several screening techniques can be used to detect early warning signs of heat stress. The following method, based on body temperature measurements, is simple and straightforward and

may be conducted by the UXOSO. Body temperature may be measured with a digital-readout clinical ear thermometer with disposable tips.

Body temperature may be measured for three minutes with an ear thermometer at the end of each work period and before drinking. Temperature at the end of the work period should not exceed 99.6°F. If the temperature does exceed 99.6°F, the next work period should be shortened by 10 minutes (or 33%), while the length of the rest period stays the same. If the temperature exceeds 99.6°F at the beginning of the next rest period, however, the following work cycle should be further shortened by 33%. Temperature should be measured again at the end of the rest period to make sure that it has dropped below 99.6°F. No worker may be permitted to continue wearing semi-permeable or impermeable garments when his/her temperature exceeds 100.6°F.

6.0 PERSONAL PROTECTIVE EQUIPMENT

6.1 General Protection Levels

Personnel must wear protective equipment when work activities involve known or suspected radiological or chemical atmospheric contamination; when vapors, gases, or particulates may be generated; or when direct contact with dermally active substances may occur. Respirators can protect the lungs, the gastrointestinal tract and the eyes against air toxicants. Chemical-resistant clothing can protect the skin from contact with skin-destructive and skin adsorbable chemicals. Good personal hygiene limits or prevents the ingestion of materials.

Equipment designed to protect the body against contact with known or anticipated chemical hazards has been divided into four categories according to the degree of protection afforded, Levels A through D. For the site inspections, it is expected that only Level D PPE will be necessary. Level D is described below:

- Level D/Modified Level D: Level D should be selected only when there are no respiratory or skin hazards suspected or known to exist at the site. Modified Level D PPE is selected when no respiratory hazards are suspected or known to exist, yet the potential for dermal hazards including contact with contaminated soils, splashes or immersion exists. If the potential for splashes or immersion exists, coated-type chemical resistant coveralls (such as Saranex) and hard hats with face shields could be selected. If the only dermal hazards that existed were related to soil sampling, a non-coated semi-permeable-type coverall (such as Tyvek) could be selected, thereby avoiding the heat stress hazards associated with an impermeable coverall.

The level of protection selected is based primarily on:

- Types and measured concentrations of the contaminants in the ambient atmosphere and their associated toxicity; and
- Potential or measured exposure to substances in air, splashes of liquids or other indirect contact with material due to the task being performed.

In situations where the types of contaminants, concentrations, and possibilities of contact are not known, the appropriate level of protection must be selected based on professional experience and

judgment until the hazards may be further characterized. The individual components of clothing and equipment must be assembled into a full protective ensemble to protect the worker from installation-specific hazards, while at the same time minimizing hazards and drawbacks of the personal protective gear itself. Ensemble components outlined in the following subsection are based on the widely used Environmental Protection Agency (EPA) Levels of Protection.

In general:

- All protective headgear shall meet the requirements of the American National Standards Institute (ANSI) Z89.1, Class A or ANSI Z89.2, Class B.
- Personnel will be provided with eye and face protective equipment when machines or operations present potential eye or face injury from physical, chemical or radiological agents. Eye and face protective equipment shall meet the requirements in ANSI Z87.1, Practice for Occupational and Educational Eye and Face Protection.
- Persons requiring corrective lenses in eyeglasses, when required by this regulation to wear eye protection, will be protected by one of the following:
 - Eyeglasses whose protective lenses provide optical correction; or
 - Goggles that can be worn over corrective lenses without disturbing the adjustment of the spectacles; or
 - Goggles that incorporate corrective lenses mounted behind the protective lenses.
- If excessive noise levels are encountered, particularly around heavy equipment operation, noise protection shall be provided as appropriate.
- Persons handling rough, sharp-edged, abrasive materials or whose work subjects the hand to lacerations, punctures, burns, or bruises will use general-purpose outer hand protection in addition to the chemical resistant inner and outer gloves, as required.
- Employees will wear clothing suitable for the weather and work conditions. The minimum will be long sleeved shirt, long trousers, and protective work shoes or boots. Canvas tennis or deck shoes are not acceptable.
- Protective footwear will be worn by all persons who are engaged in the work. Steel-toed boots cannot be worn for the SI since the metal in the shoes will limit the effectiveness of the magnetometer and EM 61.
- PPE will be inspected regularly and maintained in serviceable and sanitary condition and, before being reissued to another person or returned to storage, will be cleaned, disinfected, inspected, and repaired.

6.2 Required Level of Protection

Based upon current information regarding the hazard evaluation of the tasks to be completed (see Section 1.0), the required level of personal protection is Level D. A summary of the Level

D PPE requirements can be found in Table 6-1. The *MP Corporate Health and Safety Program Guide* (June 1988) contains the protocol for PPE and Respiratory Protection, as required by OSHA (29 CFR 1910.120).

Level D

Equipment Requirements for Level D are as follows:

- Coveralls or suitable work uniform
- Gloves (optional)
- Boots/shoes with composite toe (steel toed boots should not be worn if using a magnetometer or other geophysical instrument), leather or chemical-resistant
- Safety glasses or chemical splash goggles (optional)
- Hard hat (face shield optional)
- Hearing protection

TABLE 6-1: Summary of Level D PPE Requirements		
Level	When Required	Equipment
Level D	<p>No contaminants are present or contaminants are present below the action level.</p> <p>Work functions preclude splashes, immersion, or potential for unexpected inhalation of any radionuclides.</p>	<p>Non high-static work shirt and full-length cotton pants or coveralls</p> <p>ANSI standard Z41.4 steel-toed work boots (unless conducting magnetometer operations)</p> <p>ANSI standard Z89.1 hard hat (when working around heavy equipment or overhead “bump” hazards)</p> <p>ANSI standard Z87.1 safety glasses</p> <p>EPA standard hearing protectors (when working in high noise areas [e.g., steam cleaners and heavy equipment])</p> <p>Reflective safety vests when working around traffic areas</p> <p>Heavy duty leather work gloves (when appropriate)</p>

6.3 Inspection of PPE

Before use of protective clothing, all personnel shall determine that the clothing material is correct for the specified task at hand. The clothing is to be visually inspected for imperfect seams, non-uniform coatings, tears and malfunctioning closures. It is to be held up to the light to check for pinholes. It is to be flexed to observe for cracks or other signs of shelf deterioration. If the product has been used previously, it should be inspected inside and out for signs of chemical deterioration, such as discoloration, swelling and stiffness. During work, the clothing should be periodically inspected for evidence of chemical deterioration, closure failure, tears, punctures and seam discontinuities.

6.4 PPE Doffing Guidelines

The recommended sequence for removing PPE is as follows:

- Wash/rinse (if necessary) excess mud or other debris from outer boots, gloves, and clothing;
- Remove inner latex/nitrile gloves and cloth liners;
- Wash hands; and
- Discard disposable PPE into a properly labeled container and handled as contaminated waste.

7.0 HAZARDOUS MATERIAL MONITORING

It is not anticipated that there will be chemical exposures that would require air monitoring. Potential chemical hazards are from discrete, identifiable sources, such as oil or cleaning substances used as part of the work. Biological and explosive hazards will be monitored visually. Monitoring is not required for this project and will be addressed as a task specific evolution in the event of a scope of work change.

7.1 Radiological Monitoring

Radiological monitoring is not a part of this project nor are the site workers trained to handle this situation. In the event that any potential radiological devices are discovered, the situation will be avoided and reported immediately.

8.0 SITE CONTROL MEASURES

8.1 General

A daily log containing the names of personnel, site entry and exit times, and their levels of personal protection shall be maintained.

8.2 Site Control

Site Control is necessary to prevent unauthorized, untrained, or unprotected personnel or visitor from being exposed to the various hazards associated with the site. Level D or greater PPE will be observed at all times during the performance of field activities. Personnel performing field activities will always use the buddy system while at the site. If separation is absolutely necessary, a communication device such as cellular phone or radio will be required unless its use is restricted due to the safety. Other site control measures may include the following.

- Requiring all personnel and visitors to sign in and out on the Personnel Visitor Daily Roster.
- Requiring all site visitors to receive prior approval from the FPM. Visitors will be allowed on-site solely for the purpose of observing site conditions or operations. Upon arrival, visitors will report to the FPM or UXOSO, where he/she will receive and sign the Visitor Health and Safety Form. Visitors may not enter controlled work areas without producing documentation that training and medical requirements have been met. Visitors must be escorted in MEC areas by UXO technician.

8.3 Work Zones

In order to control the potential spread of contamination from MC and to prevent injury to Malcolm Pirnie field personnel, work zones will be classified according to two categories outlined below: a Controlled Work Zone and a Support/Clean Zone. The Support/Clean Zone will be established outside of the Controlled Work Zone and maintained as contamination free. The controlled work zone is the area inside of the site boundaries that has a potential for MEC or MC hazards. Primary functions of locations are:

- Support/Clean Zone
 - Site access for personnel, materials, and equipment;
 - Site egress for decontaminated personnel, materials, and equipment;
 - Storage area for clean work equipment;
 - An area for breaks, consumption of food and beverages, and other related activities; and
 - Vantage point for site visitors.
- Controlled Work Zone
 - Access for only those UXO trained personnel or those escorted by UXO trained personnel.

The specific location of work zone boundaries shall be determined jointly by the FPM, the UXOSO or designee and the subcontractor prior to field mobilization. Decontamination of personnel will be performed as outlined in Section 11.0 before entering the Support/Clean Zone.

Only personnel who are essential to the completion of the limited visual survey will be allowed access to work areas, if they are wearing the prescribed level of protection.

9.0 STANDARD OPERATING PROCEDURES FOR SAFETY

A range of physical and explosive hazards exist that must be understood by all field personnel assigned to work on-site. At a minimum, the safe work practices to be followed at the site shall include:

- The number of personnel and equipment on the site shall be minimized, consistent with effective site operations.
- On-site personnel shall use the "buddy" system. No one may work alone (i.e., out of earshot or visual contact with other workers). In addition, each field team will be required to carry two-way radios and have access to a cellular phone.
- Because of potential safety issues associated with abandoned and/or uninhabited buildings, site workers must stay within their designated work areas. No one should enter restricted access areas without authorization of the UXOSO.
- Site activities will be performed to minimize dust production and soil disturbance.
- Contact with surfaces/materials either suspected or known to be contaminated will be avoided to minimize the potential for transfer to personnel, the need for decontamination, and cross contamination.
- Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand-to-mouth transfer of contaminated material, is strictly prohibited in the work area outside the designated clean zone.
- Medicine and alcohol can potentiate the effects of exposure to toxic chemicals. Due to possible contraindications, use of prescribed drugs should be reviewed with the contractor or subcontractor occupational physician. Alcoholic beverage and illegal drug intake are strictly forbidden during site work activities.
- When it is necessary for a visitor to observe the fieldwork, that person will be issued appropriate PPE, briefed on potential hazards, safety practices, decontamination procedures and site communications. All site visitors must supply respiratory equipment and proof of training/fit testing to the UXOSO or designee.
- All employees have the obligation to correct or report unsafe work conditions.

10.0 DECONTAMINATION PROCEDURES

10.1 Personnel Decontamination

The decontamination procedures for this project will consist of a soap and water wash prior to eating, smoking, or drinking. The SI should not involve any direct personal exposure to any hazardous materials. Only materials that are not hazardous or are not regulated by the Resource Conservation and Recovery Act (RCRA) will be used to prevent the generation of mixed waste. Contaminated personnel shall be decontaminated using materials such as waterless hand cleaner and paper towels or rags, whenever possible, to minimize waste volumes. Good house keeping procedures as well as a common sense approach will be practiced during the SI.

10.2 Disposal Procedures

Disposal procedures for Investigation Derived Waste are presented in the Field Sampling Plan.

10.3 Confined Space Entry Procedures

There are no permit-required confined spaces anticipated for this project. If an area is suspected to be a confined space, the FPM shall halt work in the affected area and notify the facility concerned.

11.0 EMERGENCY RESPONSE PLAN

11.1 Emergency Planning

The UXOSO or designee shall implement this emergency response plan whenever conditions at the site warrant such action. The UXOSO will be responsible for assuring the evacuation, emergency treatment, and emergency transport of site personnel as necessary and notification of emergency response units and the appropriate staff.

The UXOSO or designee will inform the local fire department about the nature and duration of work expected on the site and the type of contaminants and possible health or safety effects of emergencies involving these contaminants.

11.2 Emergency Equipment

Emergency equipment will be readily accessible and distinctly marked. Malcolm Pirnie and subcontractor personnel will be familiar with the location and trained in the use of emergency equipment. Emergency equipment that will be available on-site includes:

First Aid Kits

- First Aid Kits will conform to Red Cross requirements and the requirements of 29 CFR 1910.151.
- First Aid Kits shall consist of a weatherproof container with individually sealed packages for each type of item.
- First Aid Kits will be fully equipped before being sent to the site. It will be checked weekly by the UXOSO or designee and expended items will be immediately replaced.
- First Aid Kits will be carried in the field vehicles, distinctly marked, and readily accessible.

11.3 Personnel Roles, Lines of Authority and Communication

Working on former active training ranges requires that site personnel be in constant communication with each other. All work that involves potential exposure of personnel to explosive hazards or MC requires the use of the buddy system. The responsibility of workers utilizing the buddy system include:

- Providing his/her partner with routine and emergency assistance;
- Observing his/her partner for signs of chemical exposure or heat stress;
- Periodically checking the integrity of his/her partner's PPE; and
- Notifying others if emergency help is required.

TABLE 11-1: Hand Signals	
Signal	Definition
Hands clutching throat	I cannot breathe
Hands on top of head	Need assistance
Thumbs up	I am OK; affirmative
Thumbs down	No/negative
Arms waving upright	Send backup support
Grip partners wrist	Exit area immediately
Horn - one long blast	Evacuate site
Horn - two short blast	All clear, return to site

11.4 Emergency Recognition and Prevention

As part of the initial installation-specific health and safety briefing, the UXOSO and the FPM will address emergency recognition and prevention. Topics will include hazard recognition regarding tasks to be performed in addition to hazards associated with site contaminants. Other topics relating to emergency recognition and prevention are mentioned in other chapters of the HASP.

11.5 Adverse Weather Conditions

In the event of adverse weather conditions, the FPM and UXOSO or designee will determine if work can continue without sacrificing the health and safety of site workers. Some of the items to be considered prior to determining if work should continue are:

- Potential for heat stress;

- Inclement weather-related working conditions;
- Limited visibility;
- Potential for electrical storms.

11.6 Emergency Medical Treatment/First Aid

In the event of personal injury, emergency first aid will be applied on site as deemed necessary. Decontaminate as appropriate and transport the individual to the nearest medical center if needed. Appropriate medical data sheets will be provided by the Site Safety Officer (SSO) to the medical facility. A standard Malcolm Pirnie Accident Investigation Report will be filled out.

If any personnel have been directly exposed to chemicals or contaminants of concern, follow the procedures outlined below:

- 15 minutes. Decontaminate and provide medical attention. Eye wash stations will be provided on-site. If necessary, transport to the nearest medical facility.
- Inhalation: Move to fresh air and, if necessary, transport to the nearest medical facility.
- Ingestion: Decontaminate and transport to the nearest medical facility.

In the event of a serious medical emergency, the Site Specific HASP will include:

- Route to Emergency Medical Facility
- Maps to medical facility
Emergency Numbers

11.7 Evacuation Procedures/Safe Distances

Evacuation procedures will occur at three levels: (1) withdrawal from immediate work area (100 feet or more upwind); (2) site evacuation; and (3) evacuation of surrounding area. Anticipated conditions that require these responses are described in the following subsections. If site evacuation is required, all field team members will be notified by cellular phone.

Withdrawal Upwind

Withdrawing upwind (100 feet or more) will be required when: (1) ambient air conditions contain greater contaminant concentrations than guidelines allow for the type of protection being

worn (the work crew may return after donning greater protection and/or assessing the situation as transient and past) or (2) a breach in protective clothing or minor accident occurs.

The work crew will observe general wind directions while on-site. Upon observing conditions that warrant moving away from the work site, the crew will relocate upwind a distance of approximately 100 feet or farther, as indicated by the site monitoring instruments. The HSD, FPM, Installation point of contact and the Baltimore District Project Manager will be notified if a condition exists to withdraw. When access to the site is restricted and escape is thereby hindered, the crew may be instructed to evacuate the site rather than move upwind, especially if withdrawal upwind moves the crew away from escape routes.

Site Evacuation

Evacuation of the site will be required when: (1) ambient air conditions contain explosive and persistent levels of combustible gas, excessive levels of toxic gases, or excessive dust; (2) a fire or major collapse occurs; or (3) explosion is imminent or has occurred.

After determining that site evacuation is warranted, the work crew will proceed upwind of the work site and notify the UXOSO of site conditions. If the decontamination area is upwind and more than 500 feet from the work site, the crew will pass quickly through decontamination to remove contaminated outer suits. As more facts are determined from the field crew, they will be relayed to the appropriate agencies.

The evacuation route and an upwind gathering point will be determined by the UXOSO or designee each day and communicated to all field personnel prior to beginning work. Any modifications to the evacuation route or gathering point will be discussed at the morning safety meetings.

Surrounding Area Evacuation

The area surrounding the site will be evacuated when an explosive hazard is imminent.

11.8 Site Security and Control

A daily log containing the names of personnel, including site entry and exit times and their levels of personnel protection, shall be maintained by the UXOSO or designee. Site security may involve the use of security guards to protect equipment or field personnel during investigation activities.

After a site evacuation, the senior person will take a “head count” to match against the Employee/Visitor Daily Roster; search/account for missing persons; notify the emergency crews (as applicable); and limit access into the hazardous area to only necessary rescue and response personnel to prevent additional injury and possible exposures. Work shall not resume until all hazard control issues are resolved to the satisfaction of the FPM and UXOSO.

11.9 Fire or Explosion

In case of fire or explosion, sound the emergency alarm (using the radio) and contact the facility Fire Department for outside assistance, regardless of the size of the incident. The FPM will evacuate all non-response personnel and visitors to the Safe Refuge Area and conduct a head-count. Only trained Emergency Crews will control any large-scale or potentially unmanageable incident. The FPM will direct the off-site responding agencies to the site and will provide them with the site map and a hazard briefing. The FPM and or UXOSO will complete an Incident Report for submittal to the Corporate HSD.

11.10 Spill Containment Plan

As no hazardous products will be brought on-site during the SI, a spill is not anticipated.

11.11 Emergency Response Evaluation

11.11.1 Pre-Planning and General Procedures

In the event of an emergency associated with the project activity, the UXOSO shall: 1) take immediate, diligent action to minimize the cause of the emergency; 2) alert the FPM and applicable facility personnel; and 3) institute measures necessary to prevent any repetition of the emergency. Emergency contact names, telephone numbers, and hospital route maps must be posted in the work area and/or support vehicle. At the beginning of project operations, at least the FPM and UXOSO will become familiar with the emergency route(s) and the travel time required. These procedures shall be thoroughly discussed in the initial "kick-off" briefing and in daily "tailgate" safety meetings. A cellular telephone, fully charged, will be available for any emergency.

Emergency Coordinator

The emergency coordinator (EC) will normally be the FPM or the UXOSO, with the others providing assistance as directed. First-aid and rescue duties will be shared between qualified team members. The EC will contact emergency response agencies and serve as the primary point of contact when they arrive.

Emergency Services

The EC must pre-determine the location and availability of the nearest base and civilian emergency facilities and services. Medical transport may be via ambulance or life flight, depending on response times and/or weather conditions. The EC will coordinate contractor access to base services through the range management and discuss it at the initial "kickoff" meeting.

Emergency Equipment

Maintain the following emergency equipment/supplies on-site: industrial first aid kit, portable eye washes capable of a 15-minute use, blanket or visqueen, and compressed air horn.

Store the emergency and first-aid equipment in an immediately accessible area (e.g., in the staging area). Protect equipment from the elements. The UXOSO will inspect the emergency equipment at the beginning of each field event.

12.0 RECORDKEEPING

Record keeping will include Medical Training Records, Site Safety and Health Plans and Incident Reports. In addition, records of meetings on health and safety matters will be maintained by the HSD.

12.1 Medical Surveillance Report

The employer or the employer's medical center will maintain the original medical monitoring record. 29 CFR 1910.20 requires retention of medical records until termination of employment plus 30 years. The employer shall maintain a copy of the employee's Disclosure Agreement and Physician's Statement.

12.2 Personnel Training Records

Personnel health and safety training records are maintained to document personnel qualifications and capabilities and to demonstrate compliance with company training requirements. Each installation-specific training session will be documented by a training report. The UXOSO will prepare the report and include the date of training, location, a list of attendees and a description of the material covered. The original report will be filed with the HSD. Copies of CPR/first aid training certificates will be retained.

12.3 Health and Safety Plan (HASP)

HASPs will be completed and in-place prior to each work assignment involving field activities. The HASP will be signed and approved by the HSD and FPM. The original of each completed HASP will be placed in the project file. A copy will accompany the field team and be readily available at the work site under the control of the UXOSO or designee. Copies of the HASP will be available to all employees when installation-specific training is provided.

In addition to the HASP, the following documents may also be prepared, as necessary, depending on site conditions and circumstances:

- Site Health and Safety Meeting Reports - will be documented in the field laptop that becomes part of the permanent project file. Telephone conversation records on health and safety decisions will be retained.
- Site Health and Safety Follow-up Report - will be completed by the FPM after completing work covered by the HASP. This report is an internal document only and will be maintained by the HSD.
- Health and Safety Audits - The HSD or his/her designee will periodically audit field activities to determine compliance with the HASP.

12.4 Incident Reports

In case of environmental incidents, fires, property damage, power disruption, or mandated work "shut-downs" (e.g., following storms, equipment failure), the UXOSO will complete and transmit an Incident Report to the FPM and facility management. Any damage, loss, or theft of government property (items/tools/equipment purchased for the contract) will be reported via an Incident Report or equivalent. Report damage, loss, or theft of company property to the FPM.

13.0 NEAR MISS REPORTING

Near-miss incidents that do not result in injury must also be recorded and investigated for accident prevention purposes. The FPM/UXOSO will submit completed Incident Reports to the HSD.

14.0 SUBCONTRACTOR REPORTING

The field supervisor of each subcontracting crew will investigate and complete an accident report that specifies preventive measures in accordance with their internal company policy. The FPM will ensure that this report is transmitted to the HSD within 24 hours of a significant mishap and eight hours of a serious mishap. The UXOSO will record the event on the project Accident/First-Aid Incident Summary Log.

SITE SAFETY TAILGATE MEETING



PROJECT NAME:	Joliet Army Ammunition Plant	CLIENT NAME:	USACE—Baltimore
PROJECT NUMBER:	2118-145	PROJECT LEADER:	Courtney Ingersoll
PREPARED BY:	Catherine Kelly	DATE:	
ON-SITE SAFETY MEETING RECORD			
LOCATION:			
Task to be Performed:			
I. Purpose for meeting: (check all that apply)			
	DAILY SAFETY BRIEFING		
	<i>Begin New Task. Task: Magnetometer-assisted site survey</i>		
	<i>Periodic Safety Meeting</i>		
	<i>New Site Procedures</i>		
	<i>New Site Conditions / Information</i>		
	<i>New Site Workers</i>		
MEETING ATTENDEES			
NAME (Print)		SIGNATURE	COMPANY
1.			
2.			
3.			
4.			
5.			

<i>Page 2 of 2</i>			
ON-SITE SAFETY MEETING RECORD			
II. Topic (check all that apply)			
	Site Safety Personnel		Decontamination
	Work Area Description		Emergency Response
	Site characterization		Hazard Communication
	Equipment Hazard(s)		On-site Emergency
	Biological Hazard(s)		On-site Injuries
	Chemical Hazard(s)		Evacuation Procedures
	Physical Hazard(s)		Rally Point
	Heat Stress		Emergency Communications
	Cold Stress		Directions to Hospital
	Site Control		Emergency Equipment
	Work and Support Zones		Drug and Alcohol Policies
	PPE		Medical Monitoring
	Air Monitoring		Task Training
	Safe Work Practices		Unexploded Ordnance (UXO)
III. Remarks			

V. Verification

I certify that the personnel listed on this roster received the briefing described above. Site personnel not attending this meeting will be briefed before beginning their assigned duties.

Field Project Manager Date

UXO Health and Safety Supervisor Date

Attachment 1: Installation-Specific Health and Safety Addendum

Joliet Army Ammunition Plant Health and Safety Addendum

Joliet Army Ammunition Plant, Will County, Illinois

Joliet Army Ammunition Plant (JOAAP) covers approximately 23,000 acres and is located in Will County, Illinois (IL). It is situated 10 miles south of Joliet, IL and 40 miles southwest of Chicago, IL.

Health & Safety Personnel and Contact Information

Project Manager: Courtney Ingersoll
Mobile Phone: (757) 753-8859

Field Project Manager: Catherine Kelly
Mobile Phone: (540) 998-8448

UXO Site Safety Officer: Greg Peterson, UXO Technician
Mobile Phone: (760) 888-7400

Corporate Health and Safety Manager: Chuck Myers
Work Phone: (914) 641-2610

A minimum of two on-site personnel will have current First Aid/CPR qualifications.

Primary Emergency Facility: Wilmington Healthcare Center of Morris Hospital
Address: 309 West Baltimore Street, Wilmington, IL
Phone: (815) 476-2414

Other Emergency Numbers:

Fire: 911

Police: 911

Ambulance: 911

JOAAP POC: Mr. Art Holz (815) 423-2870

Local Sheriff: (815) 476-2811

Project Manager: Baltimore Corps of Engineers, Travis McCoun (410) 962-6728

Site-specific health and safety concerns (e.g., poisonous snakes, vegetation):

Spiders, mosquitoes, ticks, feral animals, poison ivy/oak/sumac, poisonous snakes

Directions to: Wilmington Healthcare Center of Morris Hospital (from JOAAP office)

309 West Baltimore Street
Wilmington, IL
(815) 476-2414

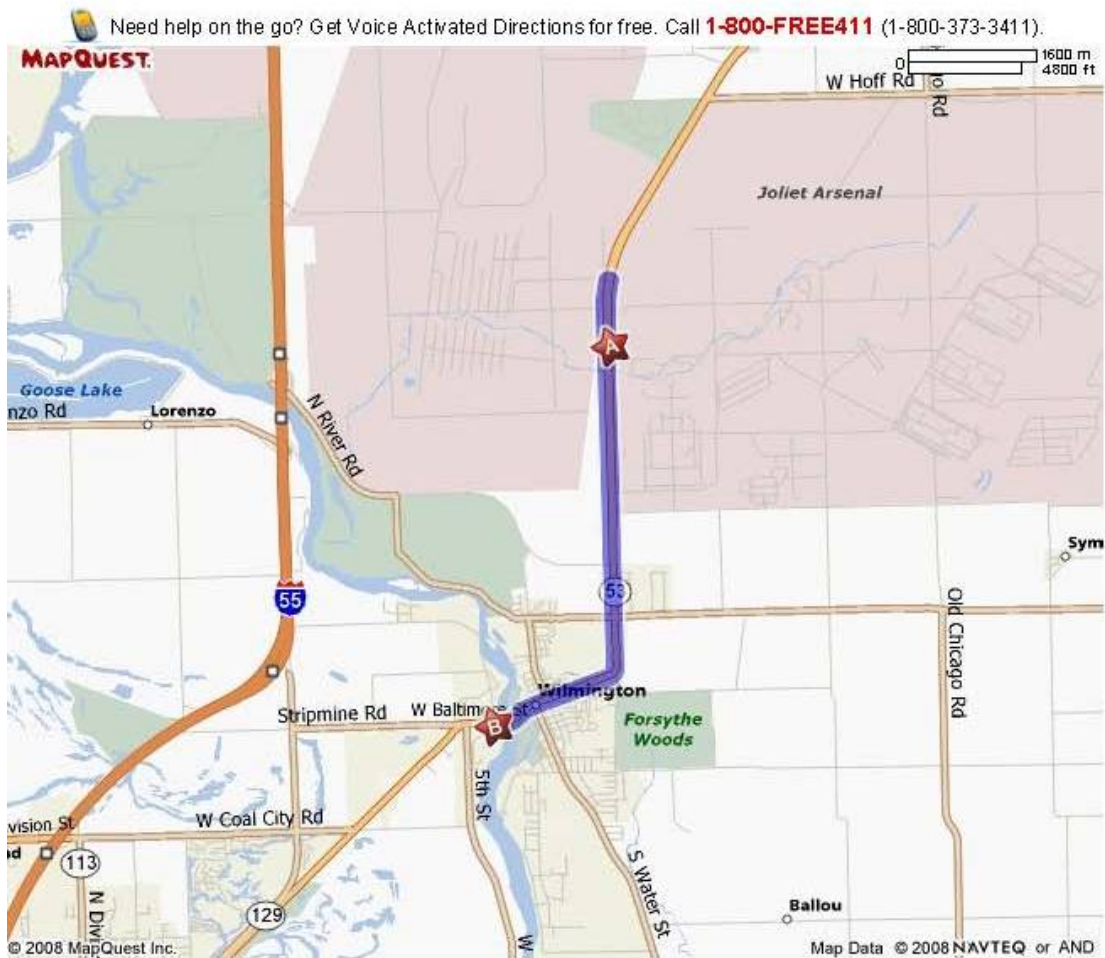
Total Time: 9 minutes Total Distance: 5.75 miles

A: 29401 S State Route 53, Wilmington, IL 60481-8879

- | | | |
|-----------------|--|--------|
| START | 1: Start out going NORTH on IL-53 N/CR-78 N. | 0.6 mi |
| SOUTH 53 | 2: Make a U-TURN onto IL-53 S. | 5.1 mi |
| END | 3: End at 309 W Baltimore St Wilmington, IL 60481-1292 | |

B: 309 W Baltimore St, Wilmington, IL 60481-1292

Total Time: 9 minutes Total Distance: 5.75 miles



Reference: www.mapquest.com

Final Health and Safety Project Plan

ACTIVITY HAZARD ANALYSIS

1. Phase of Project: Site Inspection		
2. Location: Joliet Army Ammunition Plant	3. Contract No.: W912DR-05-D-0004	4. Project: MMRP Site Inspection
5. Prime Contractor: Malcolm Pirnie	6. Date of Preparation: November 2008	7. Est. of Start Date: March 2009
Potential Safety Hazard	Procedure to Control or Mitigate Hazard	
1. Magnetometer Assisted Site Walk/Geophysical Survey	Use only trails that have been cleared by the UXO Technician. No smoking, eating or drinking. Always use the buddy system. Always check for good radio communications. Report any MEC findings and obtain a second opinion. Do not touch or move anything. Stay within an arms reach of the UXO Site Safety Coordinator. Wear the appropriate PPE.	
2. Sampling (soil)	Samples will not be collected.	
3. Slip/ Trip/ Fall	Maintain firm footing while walking on uneven surfaces. Avoid open excavations. Wear work boots that are in good condition. Watch where you walk. Only walk in areas that are marked as safe to walk in.	
4. Noise	Hearing protection should not be needed.	
5. Ticks	Check for ticks following field activities. Spray repellent around shoes, ankles and neck. Avoid rubbing against bushes and trees. Advise crew of tick borne disease symptoms. Advise crew of potential hantavirus areas.	
5. Mechanical Hazards (pinch points) for mechanical equipment including off-road vehicles	Maintain belt, chain, rotating shaft and other moving part guards in their proper position. Keep hands away from rotating/ moving parts. Conduct daily equipment safety inspections. Should not be exposed to any mechanical hazards.	
6. Unexploded Ordnance	Always use trails that have been surveyed by the UXO Site Safety Coordinator. Do not pick up, move, step on or kick any objects. Immediately report if you observe potential MEC.	
7. Magnetometer Use	Always use firm footing. Pay attention to where you are walking. Do not use as a poker in animals holes.	
8. Contractor's Rep. (Signature and Date)		

Appendix B: Technical Project Planning Session Meeting Minutes



MEETING MINUTES

Purpose: Joliet Army Ammunition Plant Site Inspection Kickoff Meeting
Stakeholders Meeting 1:30pm – 3:00pm

Location: Wilmington, Illinois

Date: 27 June 2008

Attendees	Organization	Phone	Email
Andrew Maly	USAEC	410-436-1611	andrew.maly@us.army.mil
Kim Gross	USACE-Baltimore	410-962-6735	kimberly.u.gross@usace.army.mil
Christopher Inlow	USACE-Louisville	502-315-6802	chris.inlow@usace.army.mil
Mark Freuh	USACE-Louisville	815-423-5642	mark.m.frueh@usace.army.mil
Nicole Wilson	IEPA	217-785-8729	nicole.wilson@illinois.gov
Art Holz	JOAAP	815-423-2870	arthur.m.holz@us.army.mil
Delores Kaitschuck	USDA	815-423-6370	dKaitschuck@fs.fed.us
Logan Lee	USDA	815-423-6370	llee@fs.fed.us
Kurt Adams	MWH	773-391-4236	kurt.adams@mwhglobal.com
Kathleen Anthony	MKM	916-920-9146	kanthony@mkmengineers.com
Courtney Ingersoll	Malcolm Pirnie	757-873-4415	cingersoll@pirnie.com
Catherine Kelly	Malcolm Pirnie	757-873-4386	ckelly@pirnie.com

The 11 June 2008 kick off meeting for the Military Munitions Response Program (MMRP) Site Inspection (SI) of the L2-L3 Extended Buffer Area for Joliet Army Ammunition Plant (JOAAP), Wilmington, Illinois was conducted by the United States Army Environmental Command (USAEC), United States Army Corps of Engineers (USACE), Baltimore District and Malcolm Pirnie, Inc at JOAAP in Wilmington, Illinois.

The following summarizes discussions held at the JOAAP MMRP SI kick off meeting. These notes do not include a summary of every discussion held, nor do they quote exact words used. Rather, this document is intended to be used by the group in attendance to reference previously held conversations and decisions.

- Introduction
The meeting convened at approximately 1330. All meeting attendees provided personal introductions and explained their role as it relates to the project. This kick off meeting was an agenda item on the JOAAP monthly project management meeting. These minutes encompass all discussions during the meeting.
- Kick Off Briefing
The kick off briefing was given by Ms. Courtney MS Ingersoll and Ms. Catherine Kelly, both of Malcolm Pirnie, Inc. Handouts included a copy of the briefing, and a list of acronyms, and definitions. A copy of the briefing is included in the minutes as Attachment 1.

Comments and discussion generated from the briefing are described below.

- Ms. Ingersoll summarized the MMRP to include a programmatic overview, discussions of definitions and acronyms, description of the MMRP SI implementation, process, and expectations of the stakeholders. Also, results of the Closed, Transferred, Transferring (CTT) Range/Site Inventory and previous MMRP SI were recapped to establish history for the new MMRP SI. What is known to date about the L2-L3 Extended Buffer Area Munitions Response Site (MRS) was discussed.
- Ms. Logan Lee, USDA, suggested the following as additional sources of information:
 - Heritage Group (worked extensively at the cemetery)
 - Science Club came across munitions debris while on the site
 - Environmental Ecologist with U.S. Forest Service came across munitions debris downstream of L4.
- Ms. Lee and Ms. Delores Kaitschuck mentioned they would be having a monthly meeting with some of the aforementioned potential sources of information on 17 June 2008. During the meeting they would ask the meeting participants about the area and if any had encounters with potential Munitions and Explosives of Concern (MEC). Both agreed to a phone interview by Malcolm Pirnie, Inc following the meeting. Malcolm Pirnie proposed Thursday, 19 June 2008, for the interview. Ms. Lee and Ms. Kaitschuck stated that they would be available.
- Concerns about Public Access
 - Although liability ultimately is with the Army, the USDA expressed concerns about public access to the sites. USDA asked if the Army had any specific guidance or rules regarding access to sites such as the L2-L3 Extended Buffer Area MRS. USDA is aware people wander in the area north of Paradise Creek, which lies within the buffer zone, roaming throughout the area and walking down to the road. There was a discussion about what educational material might be readily available from

the Army for public education with regard to the potential MEC hazard at the MRS.

- Mr. Maly will investigate availability for public outreach material from the USAEC for use by USDA.
- Rights of Entry (ROE)
 - Language in the Finding of Suitability for Transfer (FOST) states an open access agreement between the Army and USDA for remedial actions. The FOST most likely covers entry to the MRS for the MMRP SI activities.
 - Although Ms. Lee did not see the need for right of entry on paper, she agreed to sign a form permitting access if requested by the USACE, Baltimore District. Per Ms. Lee, Mr. Bill Mains (wmains@fs.fed.us) is the main Point of Contact (POC) for the USDA.
 - Ms. Gross will work with both the USACE Louisville and Baltimore Real Estate Managers to determine need for an ROE.
- Project Schedule
 - Dates on the proposed schedule may change based on timing of Malcolm Pirnie deliverable submissions and how quickly government and stakeholder reviews are completed. Field work is currently scheduled for 11-19 May 2009. JOAAP suggested Malcolm Pirnie be in the field by late March or April 2009 due to vegetation growth and agricultural land use.
- Previous Site Work Performed by Others
 - Ms. Anthony, MKM, suggested Mr. Troy Pfurtish (phone number: 281-932-8531) as a contact to discuss previous findings from the MMRP Interim Removal Action (IRA) in L2 and L3. Ms. Anthony requested she be contacted before calling to give Mr. Pfurtish a heads up as to the purpose of the call.
 - Ms. Anthony offered GIS data and any other data that might be useful for the L2-L3 Extended Buffer Area SI. This includes their photo log.
 - Ms. Anthony noted MKM found BLU 26's at L3; photographs are included in their photo log.
- Documents Collected

The following documents were collected by Malcolm Pirnie, Inc for use in preparing the Historical Records Review (HRR) for the L2-L3 Extended Buffer Area SI.

 - Engineering Evaluation/Cost Analysis Site L2, L3, L11, L16, L21, L34 (U.S. Army Engineering and Support Center, Huntsville, October 1999)
 - Final Report for the Ordnance Removal and Site Characterization (EODT, September 2001)
 - Final Five-Year Review Report Soils Operable Unit (MWH, April 2004)
 - Final Site Inspection Report (e²M, 25 May 2005)

- Final Remedial Design/Remedial Action Work Plan – Phase 2, Volume II of II (MWH, October 2005)
 - Final Work Plan MEC Removal Action of Sites L2 and L3 (MWH, May 2006)
 - Draft Explosives Safety Submission Amendment for the MMRP Sites L3, L2, and L34 (MKM, July 10, 2006)
 - Final Remedial Action Work Plan for the MMRP Sites L3, L2, and L34 (MKM, October 2006)
 - Draft 2006 Semi-Annual Report for the GW Operable Unit LTM (MKM, March 2008)
 - Draft Site-Specific Final Report MMRP Site L2 (MKM, March 2008)
 - Draft Site-Specific Final Report MMRP Site L3 (MKM, April 2008)
 - In addition, three CDs with numerous documents were obtained from e²M to include in research conducted by Malcolm Pirnie, Inc.
- MRSP Scores
- Mr. Gross asked if the previous MRSP scores had been advertised for public comment. Both Mr. Maly and Mr. Holz were unsure of the status. Mr. Maly offered to follow up with USAEC on the status and check procedure on public comment solicitation for the new MRS.
- Next Steps
- Malcolm Pirnie, Inc will proceed with the HRR. A stakeholder draft will be submitted no later than 7 October 2008.
- Meeting concluded at 1500.

The following action items resulted from this meeting:

- Malcolm Pirnie will provide meeting minutes to all attendees.
- Malcolm Pirnie will conduct a phone interview with USDA on 19 June 2008.
- Mr. Maly will provide public education information for USDA.
- Ms. Gross will check FOST language for the ROE.
- Mr. Maly will check the MRSP public notice status and procedure.

Attachment 1
Military Munitions Response Program Site Inspection
L2-L3 Extended Buffer Area
Joliet Army Ammunition Plant, Wilmington, Illinois
Kick Off Meeting Attendees
(13 pages)



MEETING MINUTES

Purpose: Joliet Army Ammunition Plant Site Inspection Technical Project Planning Meeting
Stakeholders Meeting 10:00am – 12:00pm

Location: Wilmington, Illinois

Date: 15 October 2008

Attendees	Organization	Phone	Email
Tom Barounis	USEPA	312-353-5577	barounis.thomas@epa.gov
Kim Gross	USACE-Baltimore	410-962-6735	kimberly.u.gross@usace.army.mil
Art Holz	JOAAP	815-423-2870	arthur.m.holz@us.army.mil
Courtney Ingersoll	Malcolm Pirnie	757-873-4415	cingersoll@pirnie.com
Catherine Kelly	Malcolm Pirnie	757-873-4386	ckelly@pirnie.com
Delores Kaitschuck	USDA	815-423-6370	dkaitschuck@fs.fed.us
Bill Mains	USDA	815-423-6370	wmains@fs.fed.us
Andrew Maly	USAEC	410-436-1611	andrew.maly@us.army.mil
Greg Peterson	Malcolm Pirnie	760-888-7400	gpeterson@pirnie.com
Nicole Wilson	IEPA	217-785-8729	nicole.wilson@illinois.gov

The 15 October 2008 Technical Project Planning (TPP) Meeting for the Military Munitions Response Program (MMRP) Site Inspection (SI) of the L2-L3 Extended Buffer Area for Joliet Army Ammunition Plant (JOAAP), Wilmington, Illinois was conducted by the United States Army Environmental Command (USAEC), United States Army Corps of Engineers (USACE), Baltimore District and Malcolm Pirnie, Inc. at JOAAP.

The following summarizes discussions held at the JOAAP MMRP TPP meeting. These notes do not include a summary of every discussion held, nor do they quote exact words used. Rather, this document is intended to be used by the stakeholders in attendance to reference previously-held conversations and decisions. Handouts including slides, glossary, and maps were provided to all attendees. Information not presented in the slides and additional discussions are included in the meeting minutes. The following issues were discussed:

- Introduction
 - The meeting convened at approximately 10:00. All meeting attendees provided personal introductions.

- Mike Saffran will be filling in for Chris Inlow (USACE—Louisville) while Chris is on detail until approximately February 2009.
- SI Briefing
The SI briefing was led by Ms. Courtney Ingersoll of Malcolm Pirnie. Handouts included a copy of the briefing and a copy of relevant maps from the Historical Records Review (HRR). A copy of the briefing and sign in sheet is included in the minutes as Attachment 1.

Comments and discussion generated from the briefing are described below.

- Ms. Ingersoll summarized the meeting goals, the SI goals, and the TPP Process, including the TPP Phases, and where the JOAAP SI project falls in the process. Currently, JOAAP is determining data needs and developing data collection methods. Within the MMRP SI framework, munitions of explosive concern (MEC) has been confirmed on site, and data will be collected to determine if an Interim Removal Action is necessary and/or if the site should proceed to a Remedial Investigation/Feasibility Study (RI/FS).
- Mr. Tom Barounis, USEPA, proposed the possibility of conducting an Engineering Evaluation/Cost Analysis (EE/CA) as opposed to an RI later in the MMRP process. Mr. Andrew Maly, USAEC, and Mr. Art Holz, JOAAP, said that an EE/CA has been considered, but future funding will play a large role in how the site is handled. Without the SI data, it is too early to determine how the site will be addressed. However, all avenues will be considered in order to provide the most efficient way to provide appropriate clean-up within the budget. Mr. Maly will be working to get funding for JOAAP as quickly as possible in order to complete the MMRP clean-up.
- Ms. Ingersoll provided a brief summary of the results of the HRR. Mr. Greg Peterson, Malcolm Pirnie, suggested the extended buffer boundary created after the 2007 USACE site walk was likely the radius from the blasting point to the location of the outermost MEC find, whereas the boundary for the extended buffer proposed following the 2007 Removal Action (RA) was determined by the Munitions of Greatest Fragmentation Distance.
- ICM Waiver
 - Mr. Peterson discussed the need for an ICM Waiver when working on site because of previous finds. An ICM Waiver is already in place (approved February 2001), so an amendment will be prepared by Malcolm Pirnie and submitted by the Army prior to conducting field work in Spring 2009.
 - Ms. Kim Gross, USACE, asked Malcolm Pirnie to coordinate with Mr. Paul Greene, USACE, in the submission of an ICM Waiver Amendment.
 - The previously approved ICM Waiver and Amendment will be included as an appendix in the SI Work Plan.

- Rights of Entry (ROE)
 - Ms. Logan Lee, USDA, has previously expressed she has little concern regarding ROEs. However, Ms. Gross will draft a formal ROE request in order to have a record of access permission.
- Proposed Field Activities
 - MEC Survey
 - Mr. Peterson presented proposed field activities to include a magnetometer-assisted MEC visual survey of 10% of the site, covering approximately 40 acres.
 - Mr. Peterson then discussed the field survey in further detail showing a map of an example of what visual survey transects could look like (see Attachment 1), but stressed that transects will be adapted in the field as necessary. Topography as well as MEC finds will dictate where transects are located. Malcolm Pirnie's suggestion is to conduct visual survey transects out to the currently proposed boundary (e.g. L2 and L3 Extended Buffer Area), and if MEC is still being encountered, extend the transects past the buffer area until MEC is no longer found.
 - At each MEC find, a GPS waypoint will be collected, notes on the MEC item will be recorded, and a photograph taken.
 - The areas surveyed by the USACE in 2007 will not be included in the survey.
 - Ms. Dolores Kaitschuck, USDA, expressed concern for the areas of USDA property being leased to farmers. The land was leased before the possibility of MEC was known, but the status of the land has now changed given the possibility of MEC. Ms. Ingersoll and Mr. Holz responded that this is part of the reasoning for making efforts to conduct the survey before Spring 2009 agricultural practices begin. Mr. Peterson confirmed that upon completing the field activities, it will be known if a potential MEC threat exists. This information will be shared with the Army to determine if a revision to the lease is required.
 - Ms. Kaitschuck will communicate with the Army and Malcolm Pirnie regarding priority areas for conducting the survey.
 - Mr. Holz expressed particular concern for the area immediately east of L3.
 - MC Sampling
 - Ms. Ingersoll discussed the potential for 15 surface soil samples during the SI and proposed eliminating these sampling efforts so

the funds would be better used to cover more acreage in the MEC survey. This recommendation was supported with the fact that MC sampling would be part of an RI, therefore Malcolm Pirnie believes surface sampling in the SI is inconsequential as presence of MEC has been determined and the MRS will be recommended for further investigation at completion of the SI. Further, the sites have been sufficiently characterized in previous soil sampling efforts.

- Mr. Holz did not believe sampling of any kind is warranted in the RI since sampling has been conducted previously. Per the 2004 ROD, NFA was received for soil.
- Ms. Ingersoll raised the question of sampling in the instance that certain areas contained no MEC. Would collecting samples in that area give rise to concluding NFA for that parcel of land provided MC constituents fell below RGs? Would IEPA and USEPA accept NFA without chemical sampling?
- Ms. Nicole Wilson, IEPA, does not believe sampling of any kind necessary in this instance since a formal boundary has yet to be established. This SI field work is for the purpose of determining the boundary. Therefore, if no MEC is found, no MC is present and the extended buffer area will not include this area. Ms. Wilson confirmed the suggested boundary is flexible and open to change given the results of the SI field activities.
- Mr. Holz confirmed the original IRP site is the only area that previously contained MC concentrations greater than previously established RGs (2004 Record of Decision). Earlier sampling results in the 200 foot buffer area and the extended buffer area showed MC concentrations in these areas were below RGs.

➤ Field Approach

▪ MEC Survey

- The TPP attendees concluded that the new Munitions Response Site (MRS) does not have to be contiguous. If MEC is not found in a particular area, it will not be included in the MRS.
- Mr. Holz recommended that the stakeholders meet post-field work to examine the data collected during the SI to determine the best method for setting the L2-L3 Extended Buffer Area boundary, and there was stakeholder consensus on this suggestion.

▪ MC Data

- Ms. Ingersoll discussed the need for data to complete the Munitions Response Site Prioritization Protocol (MRSP) forms. She asked if data should be used from the original IRP sites, or should a small number of samples be collected from the extended buffer area for

- these forms only (not to be used in characterization).
- Mr. Holz confirmed samples were collected in this area prior to transfer of the lands to USDA. He suggested referencing this data instead of collecting new data. Ms. Ingersoll agreed to review the data and determine if the analytical data are sufficient for purposes of completing MRSPPs.
- Handling MEC finds
 - Ms. Wilson expressed concern over the procedure for reporting MEC finds. Fort McCoy has been contacted on other sites, and they are not pleased with receiving multiple calls for Army sites. The Sheriff's Office has also been contacted but does not have the training for how to handle and remove MEC.
 - Ms. Gross suggested working with Paul Greene in establishing a protocol for MEC finds.
 - Mr. Peterson suggested using data that is presently available to develop a visual survey approach that starts field efforts in areas of the site expected to be the least probable of encountering MEC, and work to the areas where MEC is known to exist. This approach should minimize work stoppages at the start of the field effort allowing this effort to be completed as efficiently as possible. Some work stoppages, however, are anticipated due to MEC/ICM discoveries, procedures to report MEC/ICM finds will be coordinated with USACE, Baltimore District Mr. Greene.
- Next Steps
 - Malcolm Pirnie will proceed with the SI Work Plan. A stakeholder draft will be submitted no later than 1 December 2008.
- Meeting concluded at 11:45.

The following action items resulted from this meeting:

- Malcolm Pirnie will provide meeting minutes to all attendees.
- Malcolm Pirnie will look at data collected from within the L2-L3 Extended Buffer Area to determine if it is sufficient for completing MRSPPs.
- Malcolm Pirnie will work with USACE to submit an ICM Waiver Amendment.
- Malcolm Pirnie will work with USACE to propose a procedure for notifying the appropriate authorities is MEC/ ICMs is encountered.
- Ms. Gross will submit an ROE request to USDA.
- USDA will communicate with Malcolm Pirnie regarding particular areas of concern for the MEC survey.

Appendix C: Munitions and Explosives of Concern / Multiple Anomaly Discovery Sheet

**MALCOLM
PIRNIE**

MEC/MULTIPLE ANOMALY DISCOVERY FORM

UXO Safety Supervisor: _____

Date: _____

Anomaly ID No. (i.e. FAR A-001)				
Anomaly Longitude X/Latitude Y (Northing and Easting) Feet				
Object length	Inches			
Object Diameter/Thickness	Inches			
Object Weight (Estimated)	Lb			
Slope of terrain (Check one box)	<input type="checkbox"/> <10°	<input type="checkbox"/> 10° to 30°	<input type="checkbox"/> >30	
Vegetation cover (Check one box)	<input type="checkbox"/> Clear	<input type="checkbox"/> vegetation	<input type="checkbox"/> Swamp	
Soil type (Check one box)	<input type="checkbox"/> Sand	<input type="checkbox"/> Clay	<input type="checkbox"/> Rock	
Inclination	0°	45°	90°	135° 180°
Orientation	N-S	NW-SE	E-W	SW-NE

Item Description/Justification/Comments

Anomaly type categories (Check Appropriate Box)

- ☐ UXO ☐ DMM ☐ Munitions Debris ☐ Practice Ordnance ☐ Inert Ordnance
☐ Other ☐ Metal Waste ☐ Sub Surface Anomaly

Was photo taken? ☐ Yes ☐ No File Name: _____

Ordnance Positive Identification (If Known, Record Below and record fuze condition and disposition)

Quantity:	Ordnance Mark/Mod:	Nose Fuze Mark/Mod:	Tail Fuze Mark/Mod:
Ordnance Filler:	<input type="checkbox"/> Explosive <input type="checkbox"/> Propellant <input type="checkbox"/> Pyrotechnic <input type="checkbox"/> Other	N.E.W.	

Ordnance Category:

- | | | | |
|-------------------------------------|--|-------------------------------------|--|
| <input type="checkbox"/> Bombs | <input type="checkbox"/> Clusters/Dispensers | <input type="checkbox"/> Grenades | <input type="checkbox"/> Guided Missiles |
| <input type="checkbox"/> Land Mines | <input type="checkbox"/> Misc. Explosive Devices | <input type="checkbox"/> Mortars | <input type="checkbox"/> Projectiles |
| <input type="checkbox"/> Rockets | <input type="checkbox"/> Pyrotechnics and Flares | <input type="checkbox"/> Small Arms | <input type="checkbox"/> Underwater Ordnance |

Fuzing Types

- | | | | |
|--|--|--|--|
| <input type="checkbox"/> Piezo-Electric | <input type="checkbox"/> Proximity (VT) | <input type="checkbox"/> Impact | <input type="checkbox"/> Base Detonating |
| <input type="checkbox"/> All-ways Acting | <input type="checkbox"/> Electric | <input type="checkbox"/> Point Detonating (PD) | <input type="checkbox"/> Influence |
| <input type="checkbox"/> Mech long delay | <input type="checkbox"/> Point-initiating, Base-detonating | <input type="checkbox"/> Mechanical Time | <input type="checkbox"/> Pressure |
| <input type="checkbox"/> Powder Train Time Fuze (PTTF) | <input type="checkbox"/> MT Superquick | | |

Status of MEC/UXO ☐ Armed ☐ Unarmed

Physical Condition of MEC/UXO (Check all that apply) ☐ Broken Open ☐ Soil Staining
☐ Filler Visible ☐ Soil Sample Taken

FOR SUXOSS USE

Disposition: (Clarify Under Remarks) <input type="checkbox"/> Transport <input type="checkbox"/> Leave In Place <input type="checkbox"/> Other	Date:
Notifications To Installation By:	Signature: _____ Date: _____
Transported By:	Signature: _____ Date: _____
Transferred To:	Signature: _____ Date: _____
Storage Location:	
Destroyed By:	Signature: _____ Date: _____

Remarks: _____

Signature: _____

SUXOS

UXO – Ordnance fuzed, armed or otherwise prepared for action and fired or placed in such a manner that it constitutes a hazard

DMM – Ordnance that was disposed of by abandonment; may have been fuzed or armed, but was not employed

Inert – Same physical features as an ordnance item but does not and never did contain energetic material

Munitions Debris – Ordnance material that contained or was in contact with energetic material, which has been expended (e.g., fragments from projectile)

Appendix D: ICM Waiver and Amendment

REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF STAFF
200 ARMY PENTAGON
WASHINGTON DC 20310-0200

DACS-SF

6 FEB 2001

MEMORANDUM FOR COMMANDER, U.S. ARMY MATERIEL COMMAND,
ATTN: AMCSF-X, 5001 EISENHOWER AVENUE
ALEXANDRIA, VIRGINIA 22333-0001

COMMANDER, HUNTSVILLE CENTER, CORPS OF
ENGINEERS, ATTN: CEHCN-OE-DC, PO BOX 1600
HUNTSVILLE, ALABAMA 60481-8879

SUBJECT: Approval of Request for Waiver to the Army Prohibition on Characterizing, Maintaining, and Clearing Areas Containing Submunitions or Improved Conventional Munitions for Joliet Army Ammunition Plant Load, Assemble and Pack Facility Sites L2, L3, L11, L16, L21, and L34

1. Reference:

a. MESSAGE DA WASHINGTON DC//DAMO-TR//151835Z APR 96, subject: Ammunition Prohibited from Use During Training.

b. Draft Headquarters Department of the Army Letter, HQDA LTR 385-00-1, subject Improved Conventional Munitions and Submunitions.

c. Memorandum, U.S. Army Operations Support Command, AMSOS-SF, dated 14 July 2000, subject, Request for Waiver to the Army Prohibition on Characterizing, Maintaining, and Clearing Areas Containing Submunitions or Improved Conventional Munitions for Joliet Army Ammunition Plant Load, Assemble and Pack Facility Sites L2, L3, L11, L16, L21, and L34 with U.S. Army Materiel Command endorsement, AMCSF-X, dated 18 August 2000 (encl 1).

d. Memorandum, Huntsville Center, Corps of Engineers, CEHNC-OE-DC, dated 2 September 2000, subject, Request for Waiver to the Army Prohibition on Characterizing, Maintaining, and Clearing Areas Containing Submunitions or Improved Conventional Munitions for Joliet Army Ammunition Plant, Wilmington, IL (encl 2).

e. The Huntsville Center, Corps of Engineers' request for waiver to the Army's prohibition on clearance of ranges contaminated with improved conventional munitions (ICMs) and submunitions has been evaluated by the HQDA ICM Working Group. The request for waiver is approved for clearance, including in-place destruction, of ICMs and submunitions on the Joliet Army Ammunition Plant Load, Assemble and Pack Facility



DACS-SF

-6 FEB 2001

SUBJECT: Approval of Request for Waiver to the Army Prohibition on Characterizing, Maintaining, and Clearing Areas Containing Submunitions or Improved Conventional Munitions for Joliet Army Ammunition Plant Load, Assemble and Pack Facility Sites L2, L3, L11, L16, L21, and L34

Sites L2, L3, L11, L16, L21, and L34 per reference "d". This approval addresses clearance of ICMs and submunitions. Clearance of items other than ICMs and submunitions, including conventional munitions, will be conducted in accordance with existing approved policy and procedures.

3. Approval of this waiver is contingent upon the following:

a. Execution of ICM/submunition activities in strict accordance with requirements delineated in reference "d". The Office of the Director of Training, Deputy Chief of Staff for Operations and Plans, and the Office of the Director of Army Safety, Chief of Staff of the Army, shall be notified if there are any changes in work activities or safety controls or changes in clearance personnel, locations, conditions, or munitions for which this waiver was approved. Such changes may necessitate the re-evaluation of this waiver.

b. This waiver has been evaluated for BLU-26/B, bomblets and M39 grenades and any explosive component of an BLU-26/B or M39 submunitions. ICMs/submunitions encountered will not be contacted or touched but will be blown-in-place. If other ICMs/submunitions are discovered during range activities, all work must cease and a request for waiver in consideration of the additional ICMs/ submunitions requested.

c. Any explosive-related incident involving injury to personnel will be immediately reported (in accordance with AR 385-40). Upon the occurrence of such an incident, activities in areas containing ICMs or submunitions will be stopped until a review and validation of procedures has been completed and approved by the Commander with responsibility for the activities.

4. The Office of the Director of Training, Deputy Chief of Staff for Operations and Plans, or the Office of the Director of Army Safety, Chief of Staff of the Army shall be notified upon conclusion of these work activities.

5. Points of contact are: Mr. Anthony Rekas, Office of the Director of Training, Deputy Chief of Staff for Operations and Plans, (703) 614-4991; Mr. Leo Shanley, Munitions Division, Office of the Deputy Chief of Staff for Logistics, (703) 614-3243; Mr. Gary

DACS-SF

-6 FEB 2001

SUBJECT: Approval of Request for Waiver to the Army Prohibition on Characterizing, Maintaining, and Clearing Areas Containing Submunitions or Improved Conventional Munitions for Joliet Army Ammunition Plant Load, Assemble and Pack Facility Sites L2, L3, L11, L16, L21, and L34

Abrisz, Office of the Deputy Assistant Secretary of the Army (Environment, Safety and Occupational Health), (703) 695-7824; and Mr. Edwin Lowe, Office of the Director of Army Safety, (703) 601-2408.


GENE M. LACOSTE

Brigadier General, GS
Director of Army Safety

Encl

CF:

DASA(I&E), Mr. Abrisz
DAMO-TR, Mr. Rekas
DALO-AMA, Mr. Shanley



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
US ARMY DEFENSE AMMUNITION CENTER
1 C TREE ROAD
MCALESTER, OK 74501-9053

SIOAC-ESL (385[A])

06 OCT 2000

MEMORANDUM FOR Office of the Director of Army Safety, ATTN: DACS-SF,
Chief of Staff, 2211 South Clark Street, Room 980,
Arlington, VA 22202

SUBJECT: Request for Waiver to the Army Prohibition on Characterizing,
Maintaining and Clearing Areas of Ranges Containing Submunitions or Improved
Conventional Munitions for Joliet Army Ammunition Plant Load, Assemble and
Pack Facility Sites L2, L3, L11, L16, L21 and L34

1. References:

a. Draft Headquarters Department of the Army letter, HQDA LTR 385-00-1,
subject Improved Conventional Munitions and Submunitions.

b. Memorandum, U.S. Army Operations Support Command, AMSOS-SF, dated
July 14, 2000, SAB with Army Materiel Command endorsement, AMCSF-X, dated
August 18 2000.

2. We have reviewed the enclosed waiver request IAW reference 1.a. (2 copies
enclosed). We believe the subject document contains sufficient controls to
allow for a safe and effective clearance of those areas suspected of
containing submunitions. We recommend approval.

3. The following information is provided to assist you in your consideration
of the request. The Army Materiel Command (AMC) endorsement to reference
1.b. requests approval for the characterization of sites L2, L3 and L11 only.
The waiver request would then be resubmitted for the remainder of the project
after DoD Explosives Safety Board (DDESB) approval of the Explosives Safety
Submission (ESS). We do not feel this is necessary. In the time since AMC
forwarded their recommendation for partial approval, DDESB has approved the
ESS for the characterization of sites L2, L3 and L11 and for a removal action
in sites L16, L21 and L34. In the event the site characterization identifies
additional required clearance in sites L2, L3 and L11, the installation will
prepare an amendment to the ESS. In any case, since the hazards will remain
unchanged, we do not feel it should be necessary to revisit the waiver
request.

4. The POC is Mr. James Toburen, SMAAC-ESL, DSN 956-8784, email address
toburenj@dac-emh2.army.mil.

FOR THE DIRECTOR:

2 encl
as

Melvin L. Colberg
MELVIN L. COLBERG

Chief, Ordnance Explosives
Environmental Division

CF (wo/encl):

Commander, U.S. Army Engineering and Support Center, ATTN: CEHND-OE-CX,
P.O. Box 1600, Huntsville, AL 35807-4301

AMCSF-X (AMSOS-SF/14 July 2000) (385-10d) 1st End

Mr. Peterson/DSN 767-5481

SUBJECT: Request for Waiver to the Army Prohibition on Characterizing, Maintaining, and Clearing Areas of Ranges Containing Submunitions or Improved Conventional Munitions for Joliet Army Ammunition Plant Load Assemble and Pack Facility Sites L2, L3, L11, L16, L21, and L34

Commander, U.S. Army Materiel Command, 5001 Eisenhower Avenue,
Alexandria, VA 22333-0001 18 August 2000

FOR Department of the Army, Office of the Chief of Staff, 200
Army Pentagon, ATTN: DACS-SF, Washington, DC 20310-0200

1. The AMC Safety Office recommends the approval of the Site Characterization (SC) of Sites L2, L3, and L11 only. This office feels these SCs must be accomplished in order to complete the Explosives Safety Submission (ESS) currently awaiting approval by the Department of Defense Explosive Safety Board (DDESB). Following the SC work and approval of the ESS, this office recommends the waiver be resubmitted for the entire Removal Action at Joliet Army Ammunition Plant.

2. Point of contact is Mr. Mark Peterson, DSN 767-5481, commercial (703) 617-5481, fax DSN 767-9469, e-mail mpeterson@hqamc.army.mil.

FOR THE COMMANDER:

Encl
nc


DONALD A. PITTENGER
Chief
Safety Office

CF: (w/o encl)

Commander,

Huntsville Center, Corps of Engineers, ATTN: CEHNC-OE-DC, P.O.
Box 1600, Huntsville, AL 35807-4301

U.S. Army Operations Support Command, 1 Rock Island Arsenal,
ATTN: AMSOS-SF, Rock Island, IL 61299-6000

Director, Defense Ammunition Center, ATTN: SMAAC-ESL, 1C Tree
Road, Bldg 35, McAlester, OK 74501-9053



DEPARTMENT OF THE ARMY
HEADQUARTERS, U.S. ARMY OPERATIONS SUPPORT COMMAND (PROV)
1 ROCK ISLAND ARSENAL
ROCK ISLAND, IL 61299-6000

REPLY TO
ATTENTION OF:

AMSOS-SF (385-10d)

14 JUL 2000

MEMORANDUM FOR Headquarters, Army Materiel Command, ATTN: AMCSF,
5001 Eisenhower Avenue, Alexandria, VA 22333-0001

SUBJECT: Request for Waiver to the Army Prohibition on
Characterizing, Maintaining, and Clearing Areas of Ranges
Containing Submunitions or Improved Conventional Munitions for
Joliet Army Ammunition Plant Load, Assemble and Pack Facility
Sites L2, L3, L11, L16, L21, and L34

1. The Corps of Engineers (COE) requests waiver (encl 1) to HQDA LTR 385-00-1, Improved Conventional Munitions and Submunitions, 5 May 2000 (draft) for characterization and clearance of submunitions at "L" sites of Joliet Army Ammunition Plant (encl 2). This office forwarded the "L" sites explosive safety submission (ESS) for ordnance and explosives response action IAW HQDA LTR 385-98-1 to the Technical Center for Explosive Safety on 18 April 2000.
2. The COE anticipates unrestricted land use following removal actions. The acronym TSD used in para 12.1 OE Area table refers to team separation distance.
3. The Operations Support Command (OSC) Safety Team recommends approval of the waiver. Request AMCSF obtain Office of the Director of Army Safety (ODASAF) approval IAW para 8 encl 2.
4. The POC is Mrs. Debby Westervelt, AMSOS-SF, DSN 793-2986, E-mail amsos-sf@osc.army.mil or westerveltd@osc.army.mil.

Encl

Rosalene E. Graham
for ROSALENE E. GRAHAM
Chief, Safety/Rad Waste Team

CF:

Commander, Huntsville Center, Corps of Engineers, ATTN: CEHNC-OE-
DC/Ms. Berry, P.O. Box 1600, Huntsville, AL 35807-4301
Director, Defense Ammunition Center, ATTN: SMAAC-ESL, 1C Tree
Road, Bldg 35, McAlester, OK 74501-9053
SOSMA-ISO
SOSMA-ISD



DEPARTMENT OF THE ARMY
JOLIET ARMY AMMUNITION PLANT
29401 S. ROUTE 53
WILMINGTON, IL 60481-8879



REPLY TO
ATTENTION OF

SIOJO-CR

9 MAY 2000

MEMORANDUM FOR Commander, US Army Operations Support Command,
ATTN: AMSOS-SF (Ms. Westervelt)
Rock Island, IL 61299-6000

SUBJECT: Request for Waiver for Clearance of Submunitions and Improved
Conventional Munitions, Ordnance Removal Action and Site Characterization, Joliet
Army Ammunition Plant, Wilmington, IL

1. Reference: CEHNC-OE-DC Memorandum, SAB, dated 2 SEP 99.
2. Enclosed for your action and approval are four copies of subject request.
3. The POC is the undersigned at 815/423-2877.

ARTHUR M. HOLZ
Commander's Representative

ENCLS





DEPARTMENT OF THE ARMY
HUNTSVILLE CENTER, CORPS OF ENGINEERS
P.O. BOX 1600
HUNTSVILLE, ALABAMA 35807-4301

REPLY TO
ATTENTION OF:

CEHNC-OE-DC

2 September 1999


MEMORANDUM FOR Commander, Joliet Army Ammunition Plant,
ATTN: Mr. Art Holz, Commander's
Representative, 29401 South Route 53,
Wilmington, IL 60481-8879

SUBJECT: Request for Waiver for Clearance of Submunitions and
Improved Conventional Munitions, Ordnance Removal Action and
Site Characterization, Joliet Army Ammunition Plant, Wilmington,
IL

1. Reference: HQDA Memorandum, 385-99-1, DACS-SF, 16 April 1999, subject: Policy and Procedures for Requesting a Waiver to the Army Prohibition on Characterizing, Maintaining, and Clearing Areas of Ranges Containing Submunitions or Improved Conventional Munitions.
2. Please find enclosed 6 copies of the subject document for your review and subsequent transmittal through your Command channels to the Office of the Director of Army Safety (DACS-SF).
3. Routing and approval of the request for waiver is detailed on page 8 of the referenced HQDA memorandum.
4. If you have any questions or concerns, please contact Ms. Patti Berry at 256-895-1525.

FOR THE COMMANDER:

Encls 6


C. DAVID DOUTHAT, P.E., CSP
Director, Ordnance and
Explosives Team

CF: (w/encl)
Commander, Industrial Operations Command, ATTN: Mr. Andrew
Poppen, Bldg. 390, 4th Floor, Rock Island, IL 61299-6000
Commander, U.S. Army Engineer District, Louisville, ATTN:
CEORL-DL-B (Ms. Melody Thompson), 600 Martin Luther King
Place, P.O. 59, Louisville, KY 40201-0059



**US Army Corps
of Engineers**

**Request for Waiver to the Army Prohibition on
Characterizing, Maintaining, & Clearing Areas of Ranges
Containing Submunitions or Improved Conventional Munitions
for Joliet Army Ammunition Plant
Ordnance Removal Action
and
Site Characterization
Load, Assemble and Pack Facility
Sites L2, L3, L11, L16, L21, and L34**

**JOLIET ARMY AMMUNITION PLANT
WILMINGTON, ILLINOIS**

13 August 1999
Revised July 2000

Prepared by
US ARMY CORPS OF ENGINEERS
Engineering and Support Center, Huntsville

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1.0 Purpose and Scope

1.1 General. This ICM/Submunition waiver request was prepared by the U.S. Army Engineering and Support Center, Huntsville (USAESCH) to address the Ordnance Removal Action (RA) and Site Characterization (SC) activities that will be conducted at the Joliet Army Ammunition Plant (JAAP) located outside Wilmington, Illinois. The U.S. Army Industrial Operations Command (IOC) requested the activities and are funding this action under their Industrial Lease Program.

1.2 JAAP Facility History. JAAP was constructed in the early 1940s for exclusive use by the U.S. Army as an arsenal and manufacturing facility. Production began in September 1941, and in August 1945, the facility was placed in standby status. The plant was reactivated for the Korean Conflict in 1952 and remained in operation until 1957. From the mid-1950s through the early 1960s, JAAP was authorized to operate a production development division to gather and initiate ideas that were applicable industry-wide and to conduct development projects in the fields of design, techniques, and process development.

The facility was reactivated for the Vietnam Conflict in 1966 and continued operation until 1976, when it was placed in an inactive status. From WWII through to 1975, the LAP area continued to conduct various assembly activities involving bombs, projectiles, fuzes, and supplementary charges. This area contains load line groups capable of producing the standard 105-mm projectile, 8 inch Howitzer HE projectile, 40-mm cartridges, M14 mines, bombs, and supplementary charges. The JAAP was recently declared excess and put in Inactive-Modified Caretaker Status in 1993. Alliant Techsystems, Inc. is currently producing, test firing, and storing at JAAP, 25 and 30 millimeter (mm) cartridges and the AT-4.

2.0 Reason for Requesting Waiver

This waiver is requested to perform the Removal Action (RA) activities at sites L2, L3, L11, L16, and L21 and Site Characterization (SC) anomaly sampling within the L2, L3, and L11 sites as specified in the JAAP SOW. Areas L-11, L-16, and L21 are suspected to be contaminated with 105mm, M444 projectiles containing the M39 submunition. Additionally, areas L-2 and L-3 are suspected to be contaminated with the BLU-26/B. We request this waiver be approved for the entire site for either submunition. Site L34 is not suspected to contain improved conventional munitions (ICMs), but is included in this waiver request for information purposes only.

3.0 Name and Locations of Areas

The JAAP is a former U.S. Army munitions facility located on approximately 23,542 acres in Will County, Illinois (see Figure 1 of Appendix A). The facility has two distinct operational areas divided by State Route 53: the approximate 14 square mile explosives manufacturing (MFG) area west of Route 53; and the approximate 22 square mile Load-Assemble-Pack (LAP) area east of Route 53.

Farms are located along the southern and eastern perimeters of JAAP, with a large portion of the facility itself consisting of pasture, crop land and scattered woodlands.

A regional map showing the regional location of the JAAP within the state of Illinois is presented in Figure 1 of Appendix A.

An overall site map is presented in Figure 2 of Appendix A. This figure shows the RA/SC sites and the magazine storage area.

Planned land uses for the JAAP sites include the assignment of sites L2, L3, L21, and L34 to the U.S. Forestry Service for future recreational use, with sites L11 and L16 designated for future industrial use. It is intended that no land use restrictions will be required after removal actions have been completed in all sites. Use of sites L2, L3 and L11 where SC takes place will be restricted until a removal design, if any, can be determined and implemented based upon the OE characterization data.

Site	Size	Use	Depth of Clearance	RA or SC
L2	29ac	Explosive Burning Ground	Depth*	SC
L2	27ac	200' Perimeter	1'	RA
L3	15ac	Demo Ground	Depth*	SC
L3	24ac	200' Perimeter	1'	RA
L11	31ac	Rifle Grenade Tng Area	Depth*	SC
L11	2ac	Removal Area	4'	RA
L16	1ac	Production Area	4'	RA
L21	2ac	LAP Area	4'	RA
L34	7ac	Burning Area	4'	RA

*Sampling will continue until the area is properly characterized.

4.0 Alternatives to Proposed Activities

The activities proposed in paragraph 2.0 above will be what is required when the Explosive Safety Submission (ESS) is approved. Alternative activities will require re-approval of the ESS. The proposed removal alternatives are selected on the default clearance depths specified in DoD 6055.9 STD for the future land use. The proposed characterization alternatives will be used to justify future removal alternatives, if necessary.

5.0 Description of the Use(s) of the Sites that Led to the Presence of ICM/Submunitions

The data presented below was obtained during previous archival research performed in support of past remedial investigations, feasibility studies, and remedial designs. A brief description of why

submunitions are believed or known to exist at the sites is also presented. The actual types of OE contamination associated with each RA and SC site is presented in Table 1 of this waiver request.

1. Site L11: The L11 site was used to test firing velocities and the impact effectiveness of various munitions, with tests primarily involving 40mm grenades. Munitions were fired within the range to a target area consisting of a gravel detonation pad. This site is suspected of containing M39's.
2. Site L16: Within the spiral railroad tie building, there exists evidence of detonators and possibly fuzes that have fallen between the railroad ties. If necessary, OE removal personnel will disassemble the structure to investigate and remove any residual OE. This site is suspected of containing M39's.
3. Site L2: Site L2 is the former explosives burning grounds where ordnance, explosives and small munitions were burned on six gravel pads and three popping furnaces. The popping furnaces were used for the burning of small munitions. This site is suspected of containing BLU-26/B's.
4. Site L3: Former JAAP personnel and aerial photographs indicate that L3 was used for the burning of combustible refuse and munitions crates. However, soil sampling within this site has identified soils and ground water contaminated with explosives and heavy metals, indicating the potential for former OE burning and disposal. This site is suspected of containing BLU-26/B's.
5. Site L21: Site L21 is the former load assemble and pack area. The M444 105mm projectile is suspected to have been demilitarized here. The M39 submunition is suspected here.
6. Site 34: No exact information is available concerning the types of materials burned at the site, but a previous site visit located ceramic items believed to be the bodies of nonmetallic mines containing explosives residues. Archival data indicated that this area was used for the burning of explosives.

5.1 Archival Search Data. Table 1 presents a listing of the munitions and components manufactured or handled within the areas of concern at the JAAP. This table was created from a similar table presented in the JAAP Environmental Baseline Statement for Transfer (EBST) generated for the U.S. Army by a contractor.

TABLE 1: MUNITIONS/COMPONENTS MANUFACTURED/HANDLED

MUNITION/COMPONENT	AREA(S)	COMMENT
Large Caliber Munitions		
155mm, Shrapnel (MK1)	L2/3	
Medium Caliber Munitions		
105mm, HE, ICM (M444)	L11, L16, and L21	Loaded, Tested and Demilitarized
90mm, HE (M71)	L21	Manufacture and Demilitarized
90mm, HE-T (M71E1)	L2/3	
75mm APC-T (M61A1) w/fuze BD (M66A1)	L2/3	
37mm, TP (M63 Mod 1)	L2/3	
Mines		
Mine, Antitank (M4)	L2/3	
Mine, Antitank NM (M5)	L2, L3, and L34	
Mine, APERS, NM (M14) /integral fuze	L16	
Dispensers and Submunitions		
BLU-26/B	L2/3	
M39 sub-munitions for M444	L11, L16, and L21	Loaded, assembled and tested
Fuzes		
Fuze, MT (M43A3 and M43A4)	L 2/3	
Fuze, BD (M66, M66A1 and M68)	L2/3	
Fuze (M103)	L16	Demilitarized
Fuze, (M105 A1) without booster	L21 (61-7)	
Fuze, Proximity (M517) arming mechanism	L2	Destroyed in popping furnace
Fuze, Antitank Mine (M1, M1A1, M1A2 and M5)	L2/3	
Fuze, Antitank Mine NM, Practice (T-3E1)	L2/3	
Fuze, Bomb Nose (AN-M103)	L16	
Primers and Boosters		
Primer (M1A2)	L2/3	
Primer, Percussion (M22A2)	L2/3	Destroyed in popping furnace
Primer (M28A2&3, M31A2, M40A1, M46-49)	L2	Destroyed in popping furnace
Booster (M20) and (M20A1)	L16	
Booster (M25, M102, M104)	L16	
Booster, Auxiliary (M104)	L16	
Mortars and Rockets		
81mm Mortar, HE w/o fuze	L2/3	Loaded (L9), tested and reworked
4.5 inch Rocket (m16)	L2/3	
Supplementary Charges	L16	Manufacture, assemble & pack
Adapter and Booster (MKIII AM2)	L2/3	

6.0 Characterization of Terrain (delineated on each site map, see Appendix A)

Generally the areas flat or mounded from demolitions operations. Vegetation is either sparse or grass covered. Areas L3 and L34 contain a creek.

7.0 Ordnance and Explosives Characterization (other than ICM/Submunitions)

Table 1 above identifies ordnance used at all area addressed in the waiver request. Only L2, L3, L11, L16 and L21 are suspected of containing submunitions. Concentrations or depths of ordnance are not known.

7.1 Soil Sampling. Soil sampling for explosives in soil was conducted throughout the installation. While explosive contamination was located in soil and ground water samples taken from all of the RA and SC sites addressed by this waiver request, none of the samples exceeded the 10% threshold to be considered as explosives soils.

8.0 Ordnance and Explosives Characterization (ICM/Submunitions)

Table 1 above identifies ordnance used at all area addressed in the waiver request. Only L2, L3, L11, and L16 are suspected of containing submunitions. Concentrations or depths of ICM/submunition are not known.

9.0 Clearance Techniques

9.1 Introduction. This section presents information concerning removal of OE from the various sites

at JAAP. Included are discussions of the methods of detection, capabilities/limitation of the method, the process that will be used to determine that ordnance scrap is free of explosive hazards, and the deposition of the ordnance scrap removed from the site, or generated by the clearance activities.

The procedures included in this section will directly apply to each of the OE removal sites addressed by this waiver request. Additionally, the OE investigation and disposal procedures referenced will also be used for the OE sampling and characterization operations at sites L2, L3, and L11. If a removal action is later directed for these sites, this waiver request and the referenced procedures will again be implemented for the removal action of sites L2, L3, and L11, thereby avoiding the need for a waiver request for these three sites.

9.2 OE Detection and Removal. UXO personnel will use the Schonstedt GA-52Cx Heliflux magnetometer (52 CX) for the location of ferrous anomalies and the Whites Spectrum XLT (XLT) to locate non-ferrous anomalies. The depth of detection for a given item is dependent upon the size and orientation of the target item, as well as the characteristics of the soil. Prior to the use of both the 52 CX and the XLT at the JAAP facility, a test plot will be established for testing these instruments and the geophysical surveying and mapping (GS&M) equipment. This test plot will be established using inert OE items buried at the depths specified by the USAESCH in the SOW. Both the 52 CX and the XLT are capable of meeting the detection requirements of the SOW, which states that the OE detectors must detect a 40 millimeter (mm) grenade at a depth of one foot and a 105mm projectile at a depth of four feet. **Additionally, the detectors must be able to detect the M39 and BLU-26/B at one foot.** Daily response checks using the test plot will be documented by the UXOQCS who will ensure site personnel adjust and response check the instruments IAW this plan and the

manufacturer's instructions. If an instrument does not respond correctly, and field maintenance fails to correct the problem, that instrument will be tagged as inoperable and removed from service. Replacement equipment will be tested in the same manner as outlined above.

The use of the detection technologies presented may be limited in their application to the explosives removal sites due to the degree of vegetation growth within some of the sites. Therefore, vegetation removal/burning will be conducted as needed by the OE removal teams. It is anticipated that some degree of vegetation removal will be required within each grid. vegetation will be removed to within six inches of the surface and tree limbs will be removed to a height of six feet to allow for the effective application of the detection technologies. No trees greater than three inches in diameter will be cut down without the prior approval of the USAESCH. UXO encountered during vegetation removal will be flagged with two crossed pin flags, and reported to the SUXOS.

Once vegetation has been removed/burned from the project grids, it is not anticipated that there will be any further limitations of the OE detection methods or technologies aside from the potential for surface clutter to hinder the efficient use of the 52 CX or the XLT in the former burn sites. If this is the case, as determined by the SUXOS, a surface clearance will first be conducted at the effected explosives removal sites.

Once all site preparations have been completed within site, the 52 CXs and XLTs will be used to locate anomalies within the grid. Each grid within each site identified for OE removal shall be swept using the procedures listed below. Each of the two OE removal teams will report directly to the SUXOS and will maintain a log of its activities.

- 1) Search Lanes. Each 200 by 200 foot grid will be subdivided into individual search lanes. These lanes will be five foot wide paths adjacent to each other, running parallel to the north/south boundary line of the grid. Search lanes will be laid out using pre-marked base lines with cones or twine laid between the base line marks to form the lanes.
- 2) Grid Search. Search personnel will start at one end of each lane and will move forward toward the opposing base line. During the forward movement, the detection instrument will be moved from one side of the lane to the other, with the forward movement and the swing of the magnetometer performed at a pace that ensures complete searching of the lane while also ensuring that the instrument is able to appropriately respond to subsurface anomalies.
- 3) Excavation of Flagged Items. Surface and near-surface anomalies will be excavated using the procedures contained in Appendix E..
- 4) Anomaly Identification. The initial anomaly identification will be conducted by the UXO Technician (UXO Tech) who located the item. Once identified by the first UXO Tech, a second UXO Tech will verify the identity, condition and hazards of the item. Those items that are fuzed, unsafe to move, or are submunitions will be marked with crossed red pin flags and disposed of daily by BIP. Those items that are positively identified as being unfuzed and safe to move may be removed from the excavation, transported to a consolidated disposal area located within the grid, and disposed of at the end of the day.

Any M39 or BLU-26/B or any explosive component of an M39 or BLU-26/B regardless of condition will be BIP. The BIPs or consolidated shots will be conducted before the team leaves the grid, or at the end of each day, whichever comes first. Those items that are identified as being non-hazardous ordnance scrap or scrap will be removed and segregated.

9.3 OE Demolition. All OE-related material containing explosives will be disposed of by detonation utilizing standard demolition procedures as outlined in TM 60A-1-1-31 and appropriate 60 Series EOD Publications. All items identified for detonation will have been positively identified prior to demolition. In the event that an item cannot be identified, the SUXOS will inform the USAESCH Safety Specialist, who will request military EOD support.

Explosively contaminated OE and UXO will be disposed of on a daily basis in coordination with the USAESCH Safety Specialist. The SUXOS will verify that the PSD around the grid is clear of all nonessential personnel, and that minimum safe conditions are met prior to detonation. Personnel remaining on site will be limited to those personnel needed to safely and efficiently prepare the item(s) for destruction.

Upon completion of the demolition shot, the SUXOS will visually inspect each disposal shot. While the SUXOS performs a visual inspection of the disposal site(s), a UXO Tech will stand by at a safe distance and be prepared to render assistance in the event of an emergency. Upon completion of this inspection and providing there are no residual hazards, the SUXOS will authorize the resumption of site operations.

10.0 Number, Composition, Training and Certification of Work Teams

The number, composition, training and certification of the site personnel will be in compliance with U.S. Army Engineering and Support Center, Huntsville, Data Item Description OT-025. Only one team will operate in an ICM/submunition area at anytime. A maximum of 7 UXO qualified personnel, to include the supervisor, will comprise the team. Additionally, the USAESCH Safety Specialist and the either contractor QCS or SSHO or Senior UXO Supervisor may be within the exclusion zone for a maximum of 9 UXO qualified personnel. Non-UXO qualified personnel will not be allowed in ICM/submunitions areas during UXO operations.

11.0 Risk Analysis (see Appendix B)

12.0 Quantity - Distance

A regional map showing the regional location of the JAAP within the state of Illinois is presented in Figure 1 and relevant and appropriate Q-Ds are illustrated in Figures 2 through 8 of Appendix A of this waiver request.

An overall site map is presented in Figure 2 of Appendix A. This figure shows the RA/SC sites and the magazine storage area.

Figure 2 of Appendix A also shows the PWDs for each of the RA/SC sites, and the Q-D arc for the magazine storage area. Figures 3 through 8 in Appendix A contain individual maps of each RA/SC site, with the location of the magazine storage area (with its Q-D arc) sited in Figure 3. As required, these maps detail the OE removal depth, PWD/exclusion zone and future land use for each of the RA/SC areas. These individual site maps are presented to show sufficient detail and accurately show the relevant distances. While the map scale of the individual site maps is smaller than the preferred scale of one inch equals 400 feet, the necessary detail for the exclusion and public withdrawal zones is provided and labeled.

A map depicting the location of any planned or established demolition areas to be used is not presented in this waiver request. As specified in this waiver request, blow-in-place (BIP) will be the only method utilized by the removal contractor to dispose of ICM/submunitions. Therefore, no planned or established demolition area has been designated and since each OE site may be used for demolition, the public withdrawal distance (PWD) for the OE operations will also serve as the exclusion zone (EZ) for the demolition operations.

12.1 OE Areas. *PWD restrictions* from OE areas to non-project personnel will be applied during all surface or intrusive OE removal or characterization operations being conducted. The PWDs identified for each site are as follows:

Site	MPM	PWD (ft)	TSD (ft)	ICM	TSD (ft)
L2	155mm Mk1 Shrapnel	2,500	200	BLU/26	200
L3	155mm Mk1 Shrapnel	2,500	200	BLU/26	200
L11	40mm M433 (confirmed)	305	200	M39 (suspected)	200
L16	M39 Submunitions for M444	374	200	M39	200
L21	M39 Submunitions for M444	374	200	M39	200
L34	Mine, Antitank NM (M5)	2500	200	None suspected	N/A

These PWDs will be enforced at each site whenever project personnel are involved with OE investigation and removal operations. Preliminary site work such as surveying, laying grid lanes and anomaly detection do not require the establishment of a PWD for Q-D purposes. Project personnel are defined as those on-site contractor and DoD personnel required to participate in the OE removal/sampling, along with those approved and authorized visitors. All other personnel are non-project personnel.

For each OE removal and characterization area the outer boundary of each PWD was measured from the site boundaries rather than the center of the site. No inhabited structures or public access ways are located within the PWDs for the sites. **The team separation distance when operating in an ICM/Submunition area will be a minimum of 200 feet (see Appendix C).**

12.2 Magazines. One BATF-approved, Type 2, portable magazine will be used for explosives storage. This magazine will be secured inside a locked nine-gauge, six-foot high fenced area, located south of site L21. The magazine storage location, along with the Q-D arc associated with the magazine NEW is identified in Figure 3 of Appendix A. The Q-D arc of 670 feet is based upon the NEW of 100 pounds, in accordance with (IAW) AR385-64, paragraph 5-5.c.(3). EODT will utilize one magazine with attached detonator box. The fenced enclosure will be posted and secured with a high security lock. In addition, the magazine will be double locked and the appropriate lightning protection will be installed IAW Chapter 13 of CEHNC Interim Guidance Document 98-10. The demolition materials listed below will be stored as indicated:

<u>Storage Location</u>	<u>Item Description</u>	<u>Hazard Class</u>	<u>Compatibility Code</u>
Magazine	Detonating cord	1.1D	D
Magazine	Perforators	1.4S	S
Magazine	Time/Safety Fuze	1.4S	S
Magazine	Fuze Igniters	1.4S	S
Detonator Box	Non-electric Detonators	1.4B	B
Detonator Box	Electric detonators	1.4B	B

T-100 Two-component Green (or Yellow) Stick is classified as one part oxidizer and one part flammable liquid. While these materials create explosives when mixed they are not stored in magazines as explosives. The Green/Yellow Stick will be stored in a controlled/locked area and issued and inventoried as demolition materials.

The explosives hazard classes listed above are those provided by the supplier on the product data sheets, and they reflect commercial classifications that are usually lower than U.S. Army classifications for the same items. Additionally, the compatibility codes listed above were obtained from AR 385-64.

13. Technical Support

The contractor for this project will be EOD Technology, Inc. (EODT) of Lenoir City, Tennessee. All EODT on-site UXO personnel will meet the training and experience requirements required by the USAESCH.

No chemical warfare materials (CWM) are suspected at any of the RA or SC sites. Additionally, EODT personnel will positively identify all OE items prior to the item being moved or destroyed. If suspected CWM is found, or if an OE item cannot be positively identified, the USAESCH Safety

Specialist will request military support from the Technical Escort Unit or the 788th Ordnance Company (EOD), Fort McCoy, Wisconsin.

14. Quality Assurance/Quality Control

The UXOQCS will perform random, unscheduled audits of the various site activities to ensure that personnel accomplish all work and record keeping as specified in the WP and USAESCH SOW. These quality inspections shall include property accountability, UXO related tasks, equipment operator maintenance, PPE usage and WP compliance. Any non-conformance to contractual requirements will be documented and reported in writing to the SUXOS, QCM and PM. The SUXOS will then be responsible for the field correction of the non-conformance.

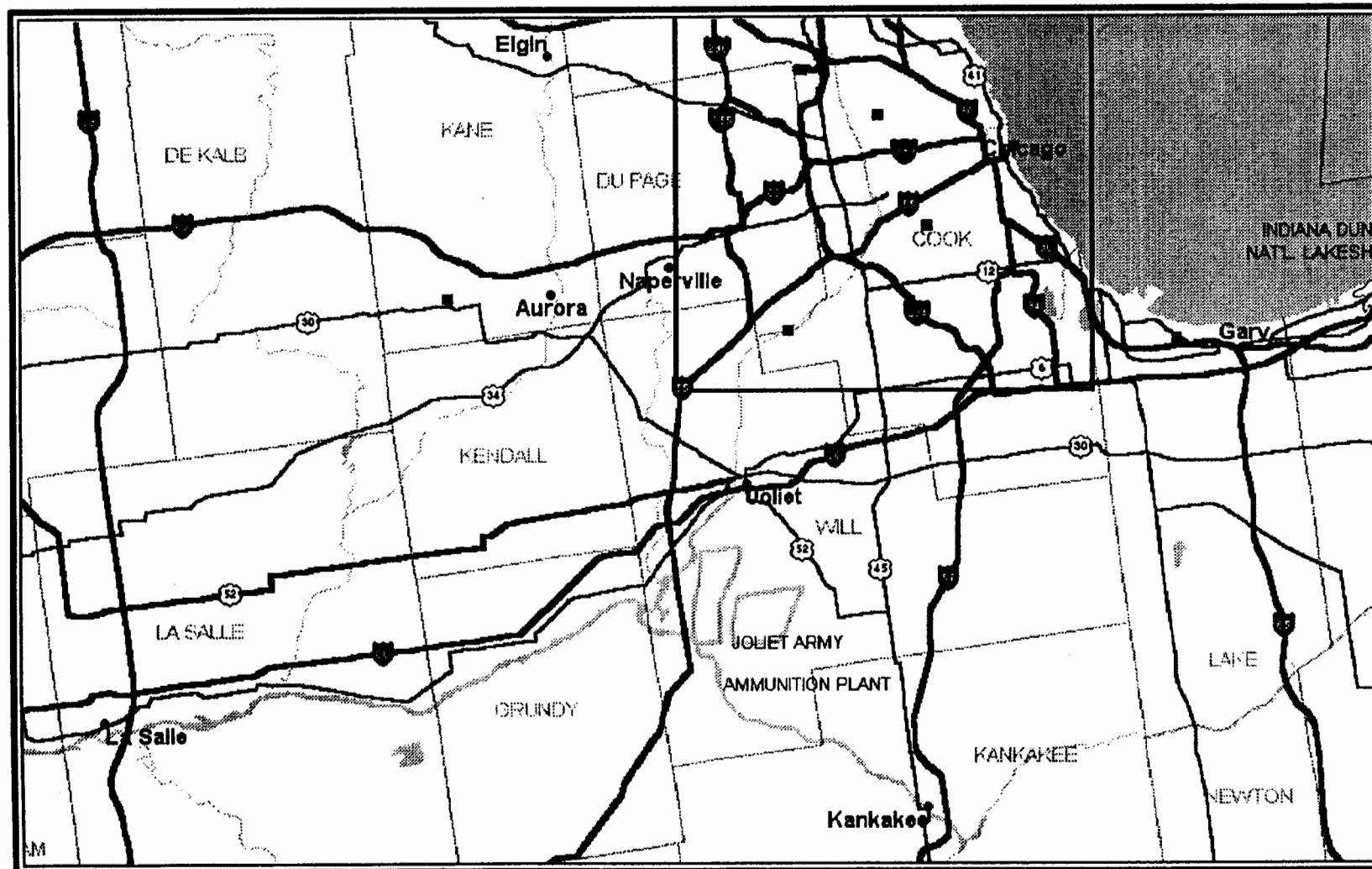
Upon conclusion of the removal activities in each grid within each site, the UXOSO/QCS will conduct a surface and subsurface QC sweep of the grid within a reasonable time after the completion of the work (five to seven working days). During this QC sweep, a minimum of 10% of a site will be checked, unless the SOW requires more than 10% be checked, in which case the SOW takes precedence. The QCS will proceed on a zig-zag pattern covering 10% of the entire site, with a report of the findings submitted to the SUXOS. Grids that pass the QC sweep will be submitted to the USAESCH for QA inspection. The pass/fail criteria for both the QC or the QA inspections will be the location of either one UXO or more than five pieces of metal greater than two square inches, located in the grid. If a grid does not pass a QC or QA inspection, it will be reported to the SUXOS and the grid will be scheduled for a re-sweep.

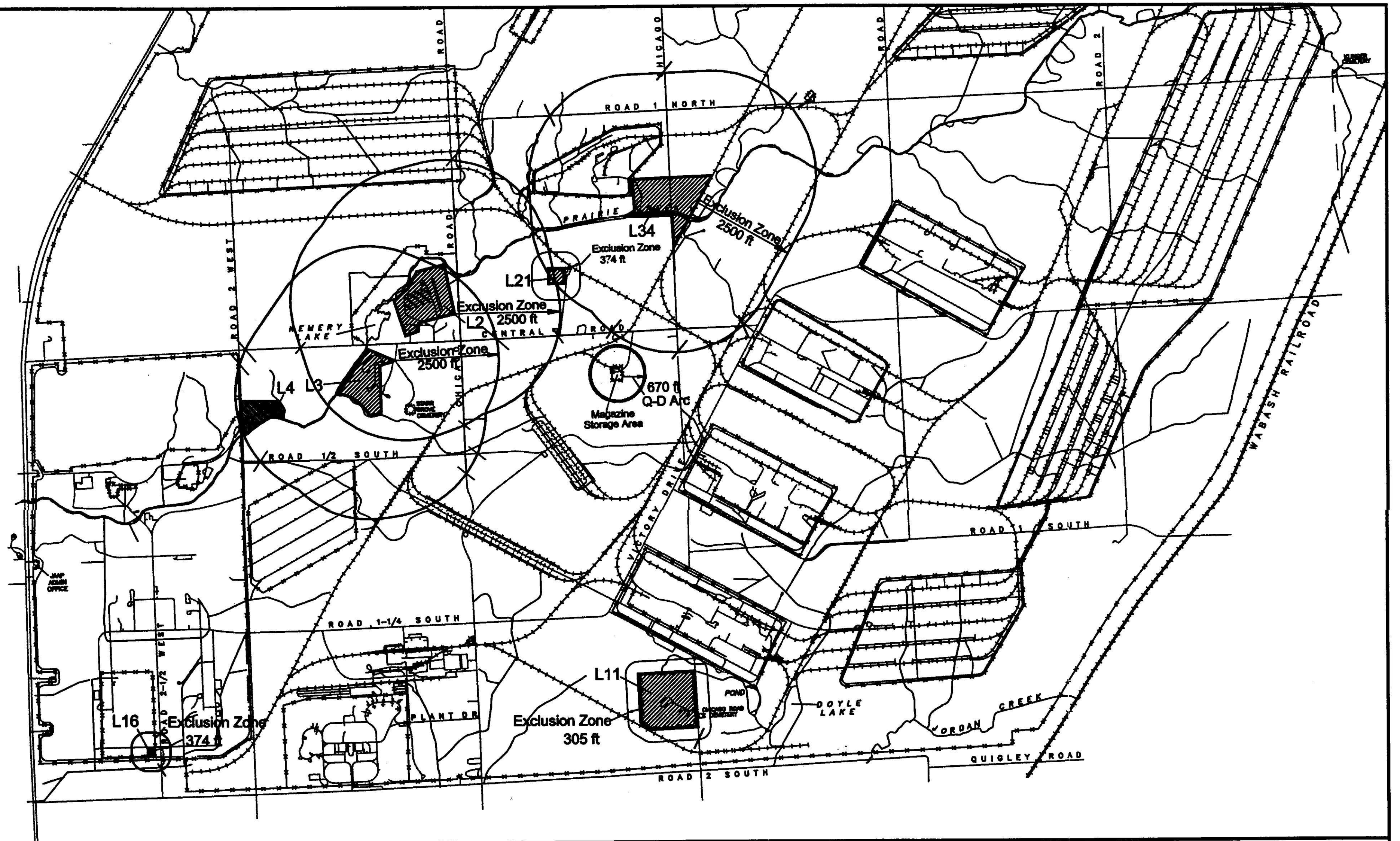
APPENDIX A

SITE MAPS

JOLIET ARMY AMMUNITION PLANT
WILMINGTON, ILLINOIS

Figure 1: Joliet Army Ammunition Plant Regional Location Map

A black and white regional map showing the Joliet Army Ammunition Plant (JAP) located in Joliet, Illinois. The map displays major highways, including Interstates 55, 54, 29, 28, 27, 26, 25, 24, 23, 22, 21, 20, 19, 18, 17, 16, 15, 14, 13, 12, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1, and 0. Major cities and towns shown include Elgin, Aurora, Naperville, Joliet, Kankakee, and Chicago. The Joliet Army Ammunition Plant is specifically marked with a star in Joliet. Surrounding counties are labeled: De Kalb, Kane, Du Page, Cook, Kendall, La Salle, Grundy, Kane, and Newton. The Indiana Dunes National Lakeshore is also indicated to the east of Chicago. A scale bar in miles is located in the bottom left corner.



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Legend:

 — Project Work Site
 — TNT Removal Area

 — Roadblock

Scale in Feet



Joliet Army Ammunition Plant
Joliet, Illinois

Project Site Map with Exclusion Zones

Drawing Version No.: Rev 1.

Date: 8/27/99

Drawn by: JKD

Checked by: ALB

Contract Number: DACA87-97-D-005

Task Order Number: 0007

Figure No.

2

Notes: Removal depth: 4 feet (once removal action is complete).
Future land use: Recreational.

ROAD 2 WEST

ROAD

PRAIRIE CREEK

L34

L21

L2

Exclusion Zone
2500 ft

CENTRAL ROAD

KEMERY LAKE

L3

L4

STARR GROVE CEMETERY

CHICAGO

670 ft
Q-D Arc

Magazine
Storage Area

ROAD 1/2 SOUTH

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Legend:



— Project Work Site



— TNT Removal Site

/ — Roadblock



Scale in Feet



Joliet Army Ammunition Plant

Joliet, Illinois

L2 Site Map

Drawing Version No.: Rev 1.

Date: 8/27/99

Drawn by: JKD

Checked by: ALB

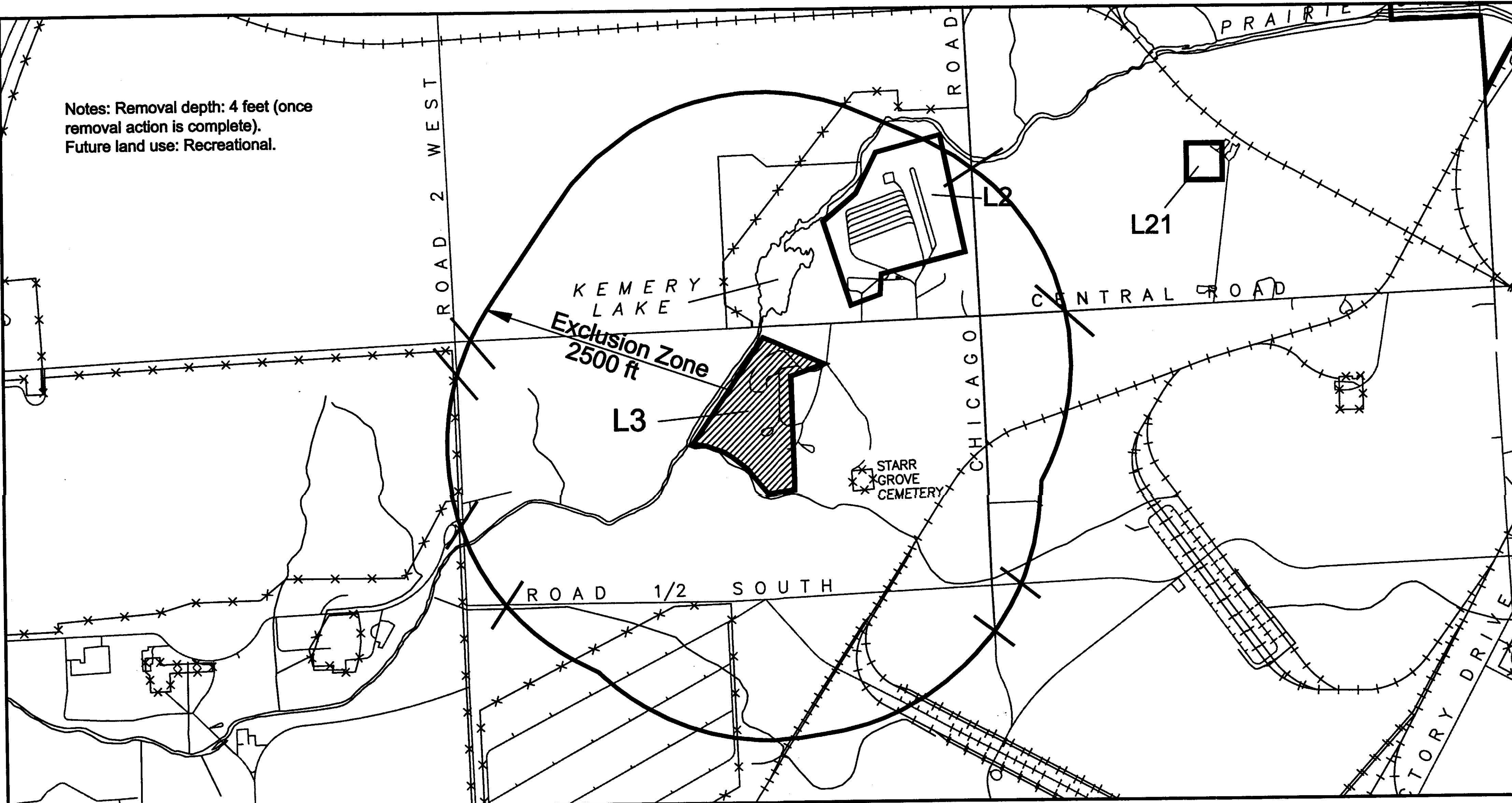
Contract Number: DACA87-97-D-005

Task Order Number: 0007

Figure No.

3

Notes: Removal depth: 4 feet (once removal action is complete).
Future land use: Recreational.



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Legend:



— Project Work Site



— Roadblock

Scale in Feet



Joliet Army Ammunition Plant

Joliet, Illinois

L3 Site Map

Drawing Version No.: Rev 1.

Date: 8/27/99

Drawn by: JKD

Checked by: ALB

Contract Number: DACA87-97-D-005

Task Order Number: 0007

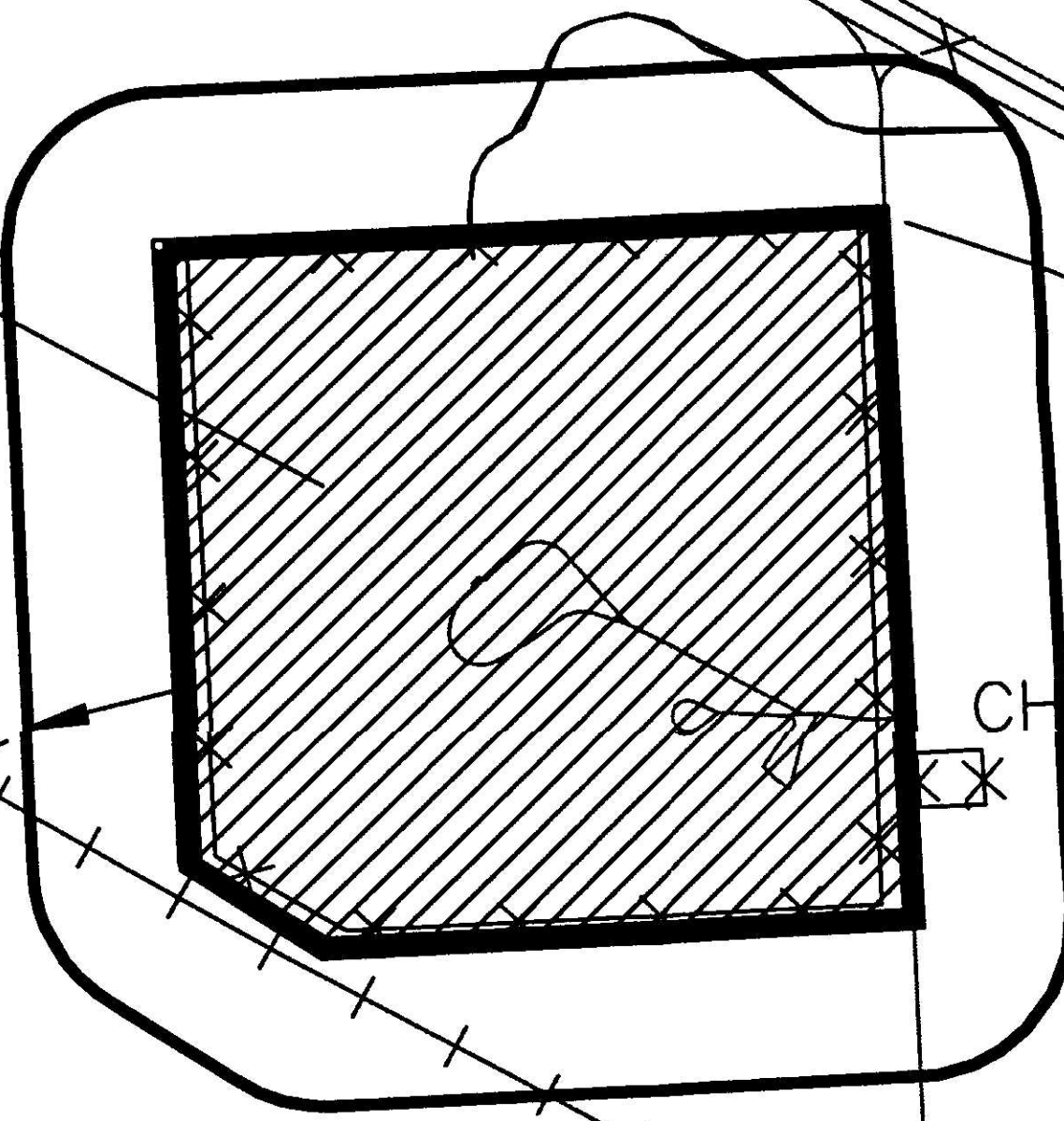
Figure No.

4

Notes: Removal depth: 4 feet (once removal action is complete).
Future land use: Industrial.

L11


Exclusion Zone
305 ft




R O A D 2 S O U T H

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Legend:

 — Project Work Site

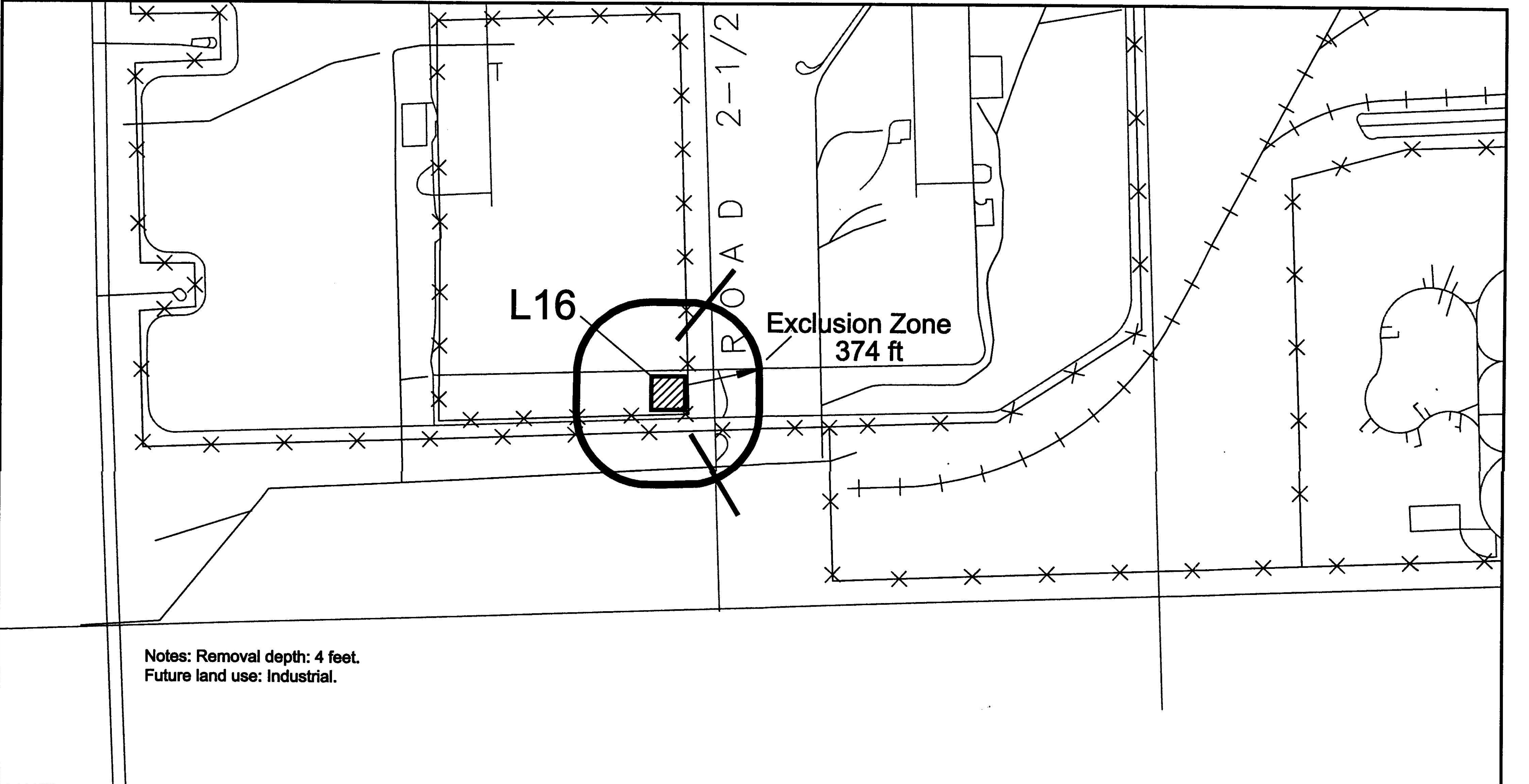
 — Roadblock

North

Scale in Feet

0 250 500

Joliet Army Ammunition Plant Joliet, Illinois			
L11 Site Map			
Drawing Version No.: Rev 1. Date: 8/27/99	Drawn by: JKD Checked by: ALB	Contract Number: DACA87-97-D-005 Task Order Number: 0007	Figure No. 5



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Legend:

 — Project Work Site

 — Roadblock



Joliet Army Ammunition Plant
Joliet, Illinois

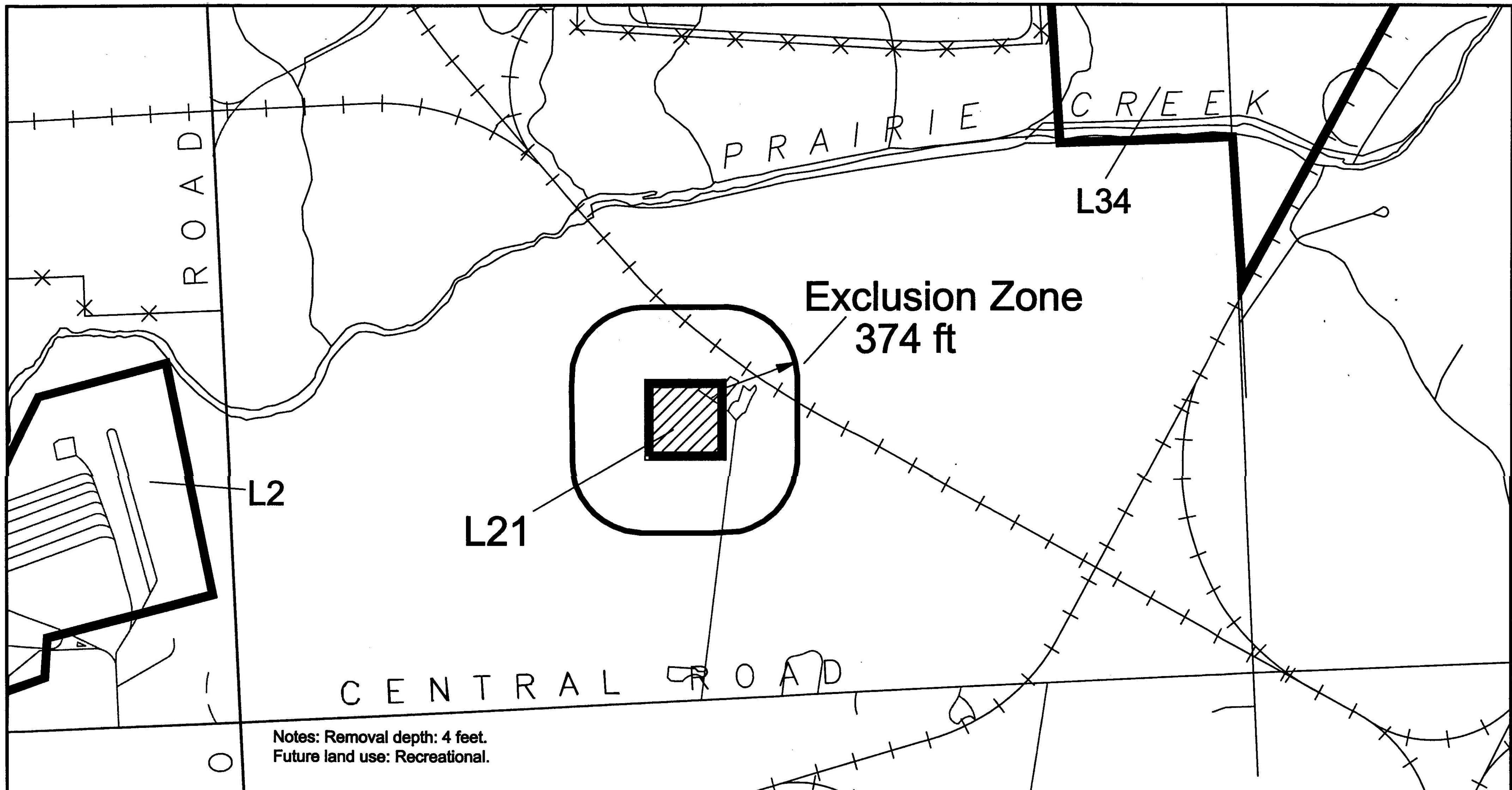
L16 Site Map

Drawing Version No.: Rev 1.
Date: 8/27/99

Drawn by: JKD
Checked by: ALB

Contract Number: DACA87-97-D-005
Task Order Number: 0007

Figure No.
6



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Legend:



— Project Work Site



— Roadblock

Scale in Feet



Joliet Army Ammunition Plant

Joliet, Illinois

L21 Site Map

Drawing Version No.: Rev 1.

Date: 8/27/99

Drawn by: JKD

Checked by: ALB

Contract Number: DACA87-97-D-005

Task Order Number: 0007

Figure No.

7

Notes: Removal depth: 4 feet.
Future land use: Recreational.

ROAD 1 NORTH

PRAIRIE CREEK

L34

Exclusion Zone
2500 ft

L2

L21

CENTRAL ROAD

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Legend:



— Project Work Site

/ — Roadblock



Scale in Feet



Joliet Army Ammunition Plant
Joliet, Illinois

L34 Site Map

Drawing Version No.: Rev 1.

Date: 8/27/99

Drawn by: JKD

Checked by: ALB

Contract Number: DACA87-97-D-005

Task Order Number: 0007

Figure No.

8

APPENDIX B

Risk Analysis

JOLIET ARMY AMMUNITION PLANT
WILMINGTON, ILLINOIS

RISK MANAGEMENT PLAN AND RISK ASSESSMENT JOLIET ARMY AMMUNITION PLANT REMOVAL ACTION AND SITE CHARACTERIZATION

GENERAL PROGRAM REQUIREMENTS

Purpose. This plan establishes management policies, objectives, and responsibilities for a risk management program for the removal action and site characterization at Joliet Army Ammunition Plant (JAAP).

References. (U) AR 385-16
(U) DA PAM 385-61
(U) MIL-STD-882
(U) AR 385-61
(U) AR 385-10
(U) FM 100-14 Risk Management
(C) TM 60T 2-2-11 (BLU-26/B)
(C) TM 60C-2-2-3 (M39)
(U) TM 60-A-1-1-22 (General EOD Safety Precautions)
Contractor's Work Plan, Site Specific Health and Safety Plan and Standard
Operating Procedures

Scope. This plan establishes the ground rules and methodology by which risk assessment will be developed and the procedures for identifying objectives, hazard identification, categorization, tracking, and elimination of Unexploded Ordnance (UXO) and Improved Conventional Munitions (ICM) hazards.

- Objectives.**
- (1) To use risk assessment as a tool for accepting risk when a requirement in AR 385-16 cannot be met.
 - (2) To ensure that no hazard is accepted without formal documentation of associated risks.
 - (3) Risk acceptance decisions are documented.

RISK MANAGEMENT

The intent of risk management plan is to optimize safety within the framework of mission accomplishment and is not to put safety "first" or ensure "zero defects". System safety is applied with the overall goal of improving operational effectiveness by conserving valuable resources and reducing inherent risk.

RISK ASSESSMENT

Risk analysis provides a useful tool for estimating the effectiveness of existing and proposed safeguards against site hazards. The potential for and consequences of hazards must be carefully analyzed. The risk assessment will consider the probabilities and consequences of any realistic accident scenario that could present a risk to workers, the environment, or the public. The risk assessment assumptions should be verified for accuracy to the maximum extent possible once field operations begin.

Hazards will be risk assessed in terms of hazard severity (Table-1) and accident probability (Table-2) and assigned a risk assessment code {RAC} (Table-3).

TABLE - 1
HAZARD SEVERITY

Category: I
Description: Catastrophic
Definition: Death or permanent total disability, system loss, major property damage.

Category: II
Description: Critical
Definition: Permanent partial disability or temporary total disability in excess of 3 months, major system damage, significant property damage.

Category: III
Description: Marginal
Definition: Minor injury, lost workday accident, or compensable injury or illness; minor system damage; minor property damage.

Category: IV
Description: Negligible
Definition: First aid or minor supportive medical treatment, minor system impairment.

TABLE - 2
ACCIDENT PROBABILITY

Description: Frequent
Level: A
Individual Item: Likely to occur frequently.

Description: Probable
Level: B
Individual Item: Will occur several times.

Description: Occasional
Level: C
Individual Item: Likely to occur sometimes.

TABLE - 2
ACCIDENT PROBABILITY (CONT.)

Description: Remote

Level: D

Individual Item: Unlikely but possible to occur.

Description: Improbable

Level: E

Individual Item: So unlikely it can be assumed occurrence may not be experienced.

TABLE - 3
RISK ASSESSMENT CODE MATRIX

Hazard Severity	Accident Probability				
	A	B	C	D	E
I	1	1	2	3	5
II	1	2	3	4	5
III	2	3	4	5	5
IV	3	4	5	5	5

SITE PREPARATION (MANUAL VEGETATION REMOVAL)

IDENTIFY RISK (HAZARD DESCRIPTION)	PRE-RAC (ASSESS RISK)	EFFECT OF THE RISK	IMPLEMENT CONTROLS (RECOMMENDED ACTIONS)	RESPONSIBLE PARTY	POST-RAC RISK ASSESSMENT
Trips, & Falls	III/C 4	Minor injuries, broken bones, cuts and scratches.	<ol style="list-style-type: none"> 1. Clear walkways and work areas of equipment, tools, vegetation, excavated materials, and debris. 2. Mark, identify, or barricade other obstructions and/or fall hazards. 	SSO	5
Lifting Heavy Objects	III/D 5	Strain lower back, muscle strains, crushed hands and feet.	<ol style="list-style-type: none"> 1. Observe Proper lifting techniques. 2. Obey sensible lifting limits. 3. Use mechanical lifting equipment to move large, awkward loads. 	All personnel	5
Sharp Objects	III/C 4	Lacerations, loss of finger/limbs.	<ol style="list-style-type: none"> 1. Wear cut resistant work gloves when possibility of lacerations to hands. 2. Maintain all hand and power tools in a safe condition. 3. Keep guards in place during use. 4. When using chain saws or machetes wear protective leggings. 	SSO, UXO Tech III, all personnel	5
Noise Levels	III/D 5	Loss of hearing.	<ol style="list-style-type: none"> 1. Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour TWA) based on noise monitoring. 	SSO, UXO Tech III	5
Unexploded Ordnance (UO) Potential OE	I/B 1	Detonation or misidentification.	<ol style="list-style-type: none"> 1. Mark and report all UXO located. 2. Only necessary personnel will be in the exclusion zone. 3. Only qualified UXO personnel will be allowed in ICM areas. 4. Post warning signs, establish exclusion zones, and stop all unauthorized personnel from entering the exclusion zone. 5. Review all known ordnance data, especially M39 and BLU-26/B data. See Appendix D 6. Positively identified OE items prior to movement. 7. If item is unknown the item will remain in place until positively identified. 	SUXOS, SSO, UXO Tech III's, and UXO Tech II	I/D 3

SITE PREPARATION (MANUAL VEGETATION REMOVAL) cont.

IDENTIFY RISK (HAZARD DESCRIPTION)	PRE-RAC (ASSESS RISK)	EFFECT OF THE RISK	IMPLEMENT CONTROLS (RECOMMENDED ACTIONS)	RESPONSIBLE PARTY	POST-RAC RISK ASSESSMENT
Biological Hazards	IV/B 4	Insect and spider bites	1. Review injury potential with field employees. 2. Mark off bee, yellow jackets, and wasp nests. 3. Use PPE.	SUXOS, SSO, & UXO Tech IIIs	5
	III/C 4	Contact Dermatitis	1. Wear PPE to avoid skin contact. 2. Identify and review plant hazards, avoidance, and first aid procedures.	SUXOS	5
Heat Stress	III/D 5	Heat Exhaustion/Stroke	1. Wear proper clothing. 2. Take appropriate weather protection measures. 3. Review SSHP on signs, symptoms, and first aid procedures.	SSO & UXO Tech III	5
Using equipment and tools	III/D 5	Cuts/Amputations, Eye Injuries/Hearing Loss/ Burns/Grinding Injuries/Physical Exertion	1. Wear appropriate PPE. 2. Maintain firm footing. 3. Kick-back and/or guards in place. 4. Sharp cutting surfaces. 5. Work/Rest regime. 6. Heat Stress monitoring. 7. Remain clear of feed and exit chute.	SUXOS, SSO, & UXO Tech III	5

SITE PREPARATIONS (ESTABLISHING BOUNDARIES AND GRIDS)

IDENTIFY RISK (HAZARD DESCRIPTION)	PRE-RAC (ASSESS RISK)	EFFECT OF THE RISK	IMPLEMENT CONTROLS (RECOMMENDED ACTIONS)	RESPONSIBLE PARTY	POST-RAC RISK ASSESSMENT
Trips, & Falls	III/C 4	Minor injuries, broken bones, cuts and scratches.	<ol style="list-style-type: none"> 1. Clear walkways and work areas of equipment, tools, vegetation, excavated materials, and debris. 2. Mark, identify, or barricade other obstructions and/or fall hazards. 	SSO	5
Lifting Heavy Objects	III/D 5	Strain lower back, muscle strains, crushed hands and feet.	<ol style="list-style-type: none"> 1. Observe Proper lifting techniques. 2. Obey sensible lifting limits. 3. Use mechanical lifting equipment to move large, awkward loads. 	All personnel	5
Sharp Objects	III/C 4	Lacerations, loss of finger/limbs.	<ol style="list-style-type: none"> 1. Wear cut resistant work gloves when possibility of lacerations to hands. 2. Maintain all hand and power tools in a safe condition. 3. Keep guards in place during use. 4. When using chain saws or machetes wear protective leggings. 	SSO, UXO Tech IIIs, all personnel	5
Noise Levels	III/D 5	Loss of hearing.	<ol style="list-style-type: none"> 1. Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour TWA) based on noise monitoring. 	SSO, UXO Tech III	5
Unexploded Ordnance (UXO)	I/B 1	Detonation	<ol style="list-style-type: none"> 1. Mark and report all UXO located. 2. Mag area prior to driving stakes into the ground. 3. If using a subcontractor, provide UXO escort at all times. 4. Follow WP/SSHP and other safety standards. 5. Review all known ordnance data, especially M39 and BLU-26/B data. See Appendix D. 6. Teams separated by a minimum of 200 feet when performing UXO operations. 7. Use magnetometers when ground surface is obstructed. 8. Only necessary personnel will be in the exclusion zone. 	SUXOS, SSO, UXO Tech IIIs, and UXO Escort	I/D 3
Heat Stress	III/D 5	Heat Exhaustion/Stroke	<ol style="list-style-type: none"> 1. Wear proper clothing. 2. Take appropriate weather protection measures. 3. Review SSHP on signs, symptoms, and first aid procedures. 	SSO & UXO Tech III	5

OE REMOVAL OPERATIONS (MARKING AND SEARCHING GRIDS/SWEEP LANES)

IDENTIFY RISK (HAZARD DESCRIPTION)	PRE-RAC (ASSESS RISK)	EFFECT OF THE RISK	IMPLEMENT CONTROLS (RECOMMENDED ACTIONS)	RESPONSIBLE PARTY	POST-RAC RISK ASSESSMENT
Trips, & Falls	III/C 4	Minor injuries, broken bones, cuts and scratches.	1. Clear walkways and work areas of equipment, tools, vegetation, excavated materials, and debris. 2. Mark, identify, or barricade other obstructions and/or fall hazards.	SSO	5
Lifting Heavy Objects	III/D 5	Strain lower back, muscle strains, crushed hands and feet.	1. Observe Proper lifting techniques. 2. Obey sensible lifting limits. 3. Use mechanical lifting equipment to move large, awkward loads.	All personnel	5
Sharp Objects	III/C 4	Lacerations, loss of finger/limbs.	1. Wear cut resistant work gloves when possibility of lacerations to hands. 2. Maintain all hand and power tools in a safe condition. 3. Keep guards in place during use. 4. When using chain saws or machetes wear protective leggings.	SSO, UXO Tech IIIs, all personnel	5
Noise Levels	III/D 5	Loss of hearing.	1. Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour TWA) based on noise monitoring.	SSO, UXO Tech III	5
Unexploded Ordnance (UXO)	I/D 3	Detonation	1. Mark and report all UXO located. 2. Flag area prior to driving stakes into the ground. 3. Follow WP/SSHP and other safety standards. 4. Do not move UXO. 5. Review all known ordnance data, especially M39 and BLU-26/B data. See Appendix D 6. Teams separated by a minimum of 200 feet when performing UXO operations. 7. Use magnetometers when ground surface is obstructed. 8. Only necessary and UXO qualified personnel are allowed in ICM areas.	SUXOS, SSO, UXO Tech IIIs, and UXO Tech II	5
Heat Stress	III/D 5	Heat Exhaustion/Stroke	1. Wear proper clothing. 2. Take appropriate weather protection measures. 3. Review SSHP on signs, symptoms, and first aid procedures.	SSO & UXO Tech III	5

OE REMOVAL OPERATIONS (MARKING AND SEARCHING GRIDS/SWEEP LANES) CONT.

1 Operations	III/c 4	See "Handling Heavy Objects" and "Slips Trips & Falls" above.	<ol style="list-style-type: none"> 1. Observe Proper lifting techniques. 2. Obey sensible lifting limits. 3. Use mechanical lifting equipment to move large, awkward loads. 4. Clear walkways and work areas of equipment, tools, vegetation, excavated materials, and debris. 5. Mark, identify, or barricade other obstructions and/or fall hazards. 6. Only UXO qualified personnel allowed in ICM areas 	All Personnel	5
etometer Operations	III/D 5	Repetitive motion	<ol style="list-style-type: none"> 1. Use wrist supports while using the magnetometers. 	SSO & UXO Tech III	5

OE REMOVAL OPERATIONS (MANUAL EXCAVATING AND REMOVING OE ANOMALIES)

IDENTIFY RISK (HAZARD DESCRIPTION)	PRE-RAC (ASSESS RISK)	EFFECT OF THE RISK	IMPLEMENT CONTROLS (RECOMMENDED ACTIONS)	RESPONSIBLE PARTY	POST-RAC RISK ASSESSMENT
Trips, & Falls	III/C 4	Minor injuries, broken bones, cuts and scratches.	<ol style="list-style-type: none"> 1. Clear walkways and work areas of equipment, tools, vegetation, excavated materials, and debris. 2. Mark, identify, or barricade other obstructions and/or fall hazards. 	SSO	5
Lifting Heavy Objects	III/D 5	Strain lower back, muscle strains, crushed hands and feet.	<ol style="list-style-type: none"> 1. Observe Proper lifting techniques. 2. Obey sensible lifting limits. 3. Use mechanical lifting equipment to move large, awkward loads. 	All personnel	5
Cutting Objects	III/C 4	Lacerations, loss of finger/limbs.	<ol style="list-style-type: none"> 1. Wear cut resistant work gloves when possibility of lacerations to hands. 2. Maintain all hand and power tools in a safe condition. 3. Keep guards in place during use. 	SSO, UXO Tech IIIs, all personnel	5
Noise Levels	III/D 5	Loss of hearing.	<ol style="list-style-type: none"> 1. Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour TWA) based on noise monitoring. 	SSO, UXO Tech III	5
Unexploded OE	I/B 1	Detonation, or misidentification.	<ol style="list-style-type: none"> 1. Mark and report all UXO located. 2. Only necessary personnel will be in the exclusion zone. 3. Only qualified UXO personnel will excavate OE in accordance with WP/SSHP and CEHNC Basic Concepts and Safety Considerations dated February 1996. See Attachment 3. 4. Only hand excavation will be permitted within the last 12" of the anomaly. 5. Post warning signs, establish exclusion zones, and stop all unauthorized personnel from entering the exclusion zone. 6. Do not move fuzed ordnance. 7. Positively identified OE items prior to movement. 8. If item is unknown the item will remain in place until positively identified. 9. Excavation and trenching will comply with WP/SSHP and 29 CFR 1926. 10. Review all known ordnance data, especially M39 and BLU-26/B data. See Appendix D 11. Teams separated by a minimum of 200 feet when performing UXO operations. 12. Use magnetometers when ground surface is obstructed. 13. Follow dig procedures in Appendix E 	SUXOS, SSO, UXO Tech IIIs, and UXO Tech II	I/D 3

IDENTIFY RISK (HAZARD DESCRIPTION)	PRE-RAC (ASSESS RISK)	EFFECT OF THE RISK	IMPLEMENT CONTROLS (RECOMMENDED ACTIONS)	RESPONSIBLE PARTY	POST-RAC RISK ASSESSMENT
Stress	III/D 5	Heat Exhaustion/Stroke	<ol style="list-style-type: none"> 1. Wear proper clothing. 2. Take appropriate weather protection measures. 3. Review SSHP on signs, symptoms, and first aid procedures. 	SSO & UXO Tech III	5

OE REMOVAL OPERATIONS (TRANSPORTING DEMOLITION MATERIAL)

IDENTIFY RISK (HAZARD DESCRIPTION)	PRE-RAC (ASSESS RISK)	EFFECT OF THE RISK	IMPLEMENT CONTROLS (RECOMMENDED ACTIONS)	RESPONSIBLE PARTY	POST-RAC RISK ASSESSMENT
Slips, Trips, and Falls	III/C 4	Minor injuries and broken bones.	<ol style="list-style-type: none"> 1. Clear walkways and work areas of equipment, tools, vegetation, excavated materials, and debris. 2. Mark, identify, or barricade other obstructions and/or fall hazards. 	SSO	5
Handling Heavy Objects	III/D 5	Strain lower back, muscle strains, crushed hands and feet.	<ol style="list-style-type: none"> 1. Observe Proper lifting techniques. 2. Obey sensible lifting limits. 3. Use mechanical lifting equipment to move large, awkward loads. 	All personnel	5
Transporting Explosives	II/D 4	Detonation, Vehicle Accident, & Vehicle Fire	<ol style="list-style-type: none"> 1. Vehicle used for transporting explosives will be inspected IAW EODT's (contractor) Vehicle Inspection Form. 2. Vehicles transporting explosives will be placard. 3. Vehicles transporting HE and blasting caps will stored in separated containers and IAW ATF P 5400.7 and IME Publications. 4. Explosives will be secured and braced in a cross-over pattern, side to side, and forward to rear. 5. Do not subject explosives to shock or friction. 6. Do not exceed speed limit or safe driving conditions. 7. At least two fire extinguishers rated at 10 BC. 8. Vehicle operators trained and licensed. 	SSO, UXO Tech IIIs, all personnel	5
High Noise Levels	III/D 5	Loss of hearing.	<ol style="list-style-type: none"> 1. Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour TWA) based on noise monitoring. 	SSO, UXO Tech III	5
Heat Stress	III/D 5	Heat Exhaustion/Stroke	<ol style="list-style-type: none"> 1. Wear proper clothing. 2. Take appropriate weather protection measures. 3. Review SSHP on signs, symptoms, and first aid procedures. 	SSO & UXO Tech III	5

OE REMOVAL OPERATIONS (DEMOLITION OPERATIONS)

IDENTIFY RISK (HAZARD DESCRIPTION)	PRE-RAC (ASSESS RISK)	EFFECT OF THE RISK	IMPLEMENT CONTROLS (RECOMMENDED ACTIONS)	RESPONSIBLE PARTY	POST-RAC RISK ASSESSMENT
Slips, Trips, & Falls	III/C 4	Minor injuries, broken bones.	<ol style="list-style-type: none"> 1. Clear walkways and work areas of equipment, tools, vegetation, excavated materials, and debris. 2. Mark, identify, or barricade other obstructions and/or fall hazards. 3. Do not carry initiators and explosives together. 	SSO	5
Lifting Heavy Objects	III/D 5	Strain lower back, muscle strains, crushed hands and feet.	<ol style="list-style-type: none"> 1. Observe Proper lifting techniques. 2. Obey sensible lifting limits. 3. Use mechanical lifting equipment to move large, awkward loads. 	All personnel	5
Sharp Objects	III/C 4	Lacerations, loss of finger/limbs.	<ol style="list-style-type: none"> 1. Wear cut resistant work gloves when possibility of lacerations to hands. 	SSO, UXO Tech III, all personnel	5
Noise Levels	III/D 5	Loss of hearing.	<ol style="list-style-type: none"> 1. Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour TWA) based on noise monitoring. 	SSO, UXO Tech III	5
Demolition of Ordnance Explosives	I/B 1	Detonation, misidentification or premature detonation.	<ol style="list-style-type: none"> 1. Account for all explosives and items to be destroyed. 2. Only necessary personnel will be in the exclusion zone. 3. Only qualified UXO personnel will perform demolitions operations in accordance with WP/SSHP. 4. Post warning signs, establish exclusion zones, and stop all unauthorized personnel from entering the exclusion zone. 5. Do not move fuzed ordnance. 6. Positively identified OE items prior to movement. 7. If item is unknown the item will remain in place until positively identified. 8. BIP is the first option. 9. The blaster shall keep control of the blasting machine. 10. When initiating charges evacuate to the maximum fragment distance and seek cover. 11. When necessary tamp all shots to reduce fragmentation. 	SUXOS, SSO, UXO Tech IIIs, and UXO Tech II	5
Setting and placing Explosive Charges	II/D 4	Accidental Detonation, Seismic Damage, Fragmentation Damage, and Chemical Hazard	<ol style="list-style-type: none"> 1. Obtain approval and coordinate with Range Control. 2. Only qualified UXO personnel will be involved with demolition operations. 3. Minimize personnel exposure. 4. Utilize procedures in WP/SSHP and 29 CFR 1910.109. 5. Observe safe fragmentation and blast distances. 6. Observe EMR hazards. 7. If necessary use tamping material. 8. Wear chemical resistance gloves when handling exposed or bulk explosive. 9. Ensure necessary safety and communications equipment is on hand. 	SUXOS, SSO, & UXO Tech III	5

OE REMOVAL OPERATIONS (HEAVY EQUIPMENT OPERATION)

IDENTIFY RISK (HAZARD DESCRIPTION)	PRE-RAC (ASSESS RISK)	EFFECT OF THE RISK	IMPLEMENT CONTROLS (RECOMMENDED ACTIONS)	RESPONSIBLE PARTY	POST-RAC RISK ASSESSMENT
Slips, Trips, & Falls	III/C 4	Minor injuries, broken bones, cuts and scratches.	<ol style="list-style-type: none"> 1. Clear walkways and work areas of equipment, tools, vegetation, excavated materials, and debris. 2. Mark, identify, or barricade other obstructions and/or fall hazards. 	SSO	5
Lifting Heavy Objects	III/D 5	Strain lower back, muscle strains, crushed hands and feet.	<ol style="list-style-type: none"> 1. Observe Proper lifting techniques. 2. Obey sensible lifting limits. 3. Use mechanical lifting equipment to move large, awkward loads. 	All personnel	5
Excavating/Backfilling	II/D 4	Struck by/Against Heavy equipment (Lacerations, loss of finger/limbs), Fire Hazard from refueling Equipment, & Unsafe Mechanical Equipment.	<ol style="list-style-type: none"> 1. Wear reflective warning vest. 2. Avoid equipment swing/pinching areas. 3. Make eye contact with operators before approaching equipment. 4. Understand and review hand signals. 5. Use spotter where necessary. 6. Fire extinguisher will be placed near fuel storage/refueling areas. 7. Fuel will be stored at least 50 feet away from the work site. 8. No smoking during refueling. 9. Ground/bond equipment during refueling. 10. All equipment will be inspected, tested, and certified to be in a safe working condition by a competent person prior to use. 11. Only necessary personnel in the exclusion zone. 	SSO, UXO Tech IIIs, all UXO qualified equipment operators	5
Stress	III/D 5	Heat Exhaustion/Stroke	<ol style="list-style-type: none"> 1. Wear proper clothing. 2. Take appropriate weather protection measures. 3. Review SSHP on signs, symptoms, and first aid procedures. 	SSO & UXO Tech III	5
Noise Levels	III/D 5	Loss of hearing.	<ol style="list-style-type: none"> 1. Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour TWA) based on noise monitoring. 	SSO, UXO Tech III	5

IDENTIFY RISK (HAZARD DESCRIPTION)	PRE-RAC (ASSESS RISK)	EFFECT OF THE RISK	IMPLEMENT CONTROLS (RECOMMENDED ACTIONS)	RESPONSIBLE PARTY	POST-RAC RISK ASSESSMENT
Excavation Soil Operations	II/D 4	Struck by falling objects, getting caught in equipment (Lacerations, loss of finger/limbs), Fire Hazard from refueling Equipment, potential OE, & Unsafe Mechanical Equipment.	<ol style="list-style-type: none"> 1. Wear reflective warning vest. 2. Avoid equipment moving parts/pinching areas. 3. Make eye contact with operators before approaching equipment. 4. Understand and review hand signals. 5. Use safety spotter where necessary. 6. Fire extinguisher will be placed near fuel storage/refueling areas. 7. Fuel will be stored at least 50 feet away from the work site. 8. No smoking during refueling. 9. Ground/bond equipment during refueling. 10. All equipment will be inspected, tested, and certified to be in a safe working condition by a competent person prior to use. 11. Only necessary personnel in the exclusion zone. 	SSO, UXO Tech III, UXO qualified equipment operators	5

OE REMOVAL OPERATIONS (HEAVY EQUIPMENT OPERATION) CONT.

IDENTIFY RISK (HAZARD DESCRIPTION)	PRE-RAC (ASSESS RISK)	EFFECT OF THE RISK	IMPLEMENT CONTROLS (RECOMMENDED ACTIONS)	RESPONSIBLE PARTY	POST-RAC RISK ASSESSMENT
ential OE	I/D 3	Detonation or misidentification.	<ol style="list-style-type: none"> 1. Mark and report all UXO located. 2. Only personnel necessary to the excavating activity will be in the exclusion zone. 3. A UXO Supervisor will supervise non-UXO qualified personnel excavating OE in accordance with WP/SSHP. 4. Only hand excavation will be permitted within the last 12" of the OE anomaly. 5. Post warning signs, establish exclusion zones, and stop all unauthorized personnel from entering the exclusion zone. 6. Do not move fuzed ordnance. 7. Positively identified OE items prior to movement. 8. If item is unknown the item will remain in place until positively identified. 9. Do not use earth moving machinery within 12" of a subsurface OE item. 10. Excavation and trenching will comply with WP/SSHP and 29 CFR 1926.. 9. Only qualified /licensed personnel will operate heavy equipment. 	SUXOS, SSO, UXO Tech IIIs, and UXO Tech IIs	5

OE REMOVAL OPERATIONS (SURFACE CLEARANCE OPERATION)

IDENTIFY RISK (HAZARD DESCRIPTION)	PRE-RAC (ASSESS RISK)	EFFECT OF THE RISK	IMPLEMENT CONTROLS (RECOMMENDED ACTIONS)	RESPONSIBLE PARTY	POST-RAC RISK ASSESSMENT
Slips, Trips, & Falls	III/C 4	Minor injuries, broken bones, cuts and scratches.	1. Clear walkways and work areas of equipment, tools, vegetation, excavated materials, and debris. 2. Mark, identify, or barricade other obstructions and/or fall hazards.	SSO	5
Handling Heavy Objects	III/D 5	Strain lower back, muscle strains, crushed hands and feet.	1. Observe Proper lifting techniques. 2. Obey sensible lifting limits. 3. Use mechanical lifting equipment to move large, awkward loads.	All personnel	5
Sharp Objects	III/C 4	Lacerations, loss of finger/limbs.	1. Wear cut resistant work gloves when possibility of lacerations to hands.	SSO, UXO Tech IIIs, all personnel	5
High Noise Levels	III/D 5	Loss of hearing.	1. Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour TWA) based on noise monitoring.	SSO, UXO Tech III	5
Potential OE	I/B 1	Detonation	1. Mark and report all UXO located. 2. Mag area prior to driving stakes into the ground. 3. Follow WP/SSHP and other safety standards. 4. Do not move ICM. 5. Review all known ordnance data especially M39 and BLU-26/B data. See Appendix D 6. Teams separated by a minimum of 200 feet when performing UXO operations. 7. Use magnetometers when ground surface is obstructed. 8. Only necessary personnel will be in the exclusion zone. 9. Only qualified UXO personnel conduct surface sweep operations in the ICM area.	SUXOS, SSO, UXO Tech IIIs, and UXO Tech II	I/D 3
Heat Stress	III/D 5	Heat Exhaustion/Stroke	1. Wear proper clothing. 2. Take appropriate weather protection measures. 3. Review SSHP on signs, symptoms, and first aid procedures.	SSO & UXO Tech III	5
Magnetometer Operations	III/D 5	Repetitive motion	1. Use wrist supports while using the magnetometers.	SSO & UXO Tech III	5

APPENDIX C

Fragment Distance Calculations

JOLIET ARMY AMMUNITION PLANT
WILMINGTON, ILLINOIS

Public Withdrawal Distance (PWD)
Joliet AAP
17 August 1999

MUNITION: M39 submunition
REQUESTED BY: Patti Berry
PREPARED BY: Michelle Crull, PhD, PE

This form shows calculated distances only. It does not constitute approval. Concurrence of CEHNC-OE-S is required to determine the applicable distance for a specific site.

In accordance with (IAW) OE Center of Expertise Interim Guidance Document 98-08, use of the range to no more than 1 hazardous fragment/600 sq ft as the PWD for accidental detonations requires written justification, a risk analysis, calculation of this distance by CEHNC-ED-CS-S, and concurrence of CEHNC-OE-S.

ACCIDENTAL DETONATIONS

Maximum Fragment Range = 364 ft
Range to No More Than 1 Hazardous Fragment/600 sq ft = N/A ft
Range to 0.9 psi Overpressure = 20 ft

IAW OE Center of Expertise Interim Guidance Document 98-08, the PWD for intentional detonations may not be less than the default distance provided in DoD 6055.9-STD or the maximum fragment range or the K328 overpressure distance.

INTENTIONAL DETONATIONS

Maximum Fragment Range = 364 ft
K328 Overpressure Range = 130 ft

The primary fragmentation characteristics used in the calculation of the values listed above were computed IAW CEHNC-ED-CS-S-98-1. The maximum fragment range was calculated using the maximum weight fragment and the initial velocity from these characteristics in the computer software TRAJ. The range to no more than 1 hazardous fragment/600 sq ft was calculated IAW CEHNC-ED-CS-S-98-2.

TEAM SEPARATION DISTANCE

In accordance with the memorandum for US Army South dated 4 May 1999 from DACS-SF, the minimum team separation distance will be the largest of the following:

Public Withdrawal Distance (PWD)
Joliet AAP
17 August 1999

- 200 ft
- the K50 distance plus a 50% safety factor = 28 ft
- the maximum fragment throw distance with the potential for skin penetration plus a 50% safety factor = 146 ft

Therefore, the team separation distance is 200 ft.

SIGNATURES:

Michelle Cull 8/17/99
Subject Matter Expert

William H. Zehrf 17 Aug 99
CEHNC-ED-CS S Branch Chief

Public Withdrawal Distance (PWD)
Joliet AAP
17 August 1999

MUNITION: BLU 26b
REQUESTED BY: Patti Berry
PREPARED BY: Michelle Crull, PhD, PE

This form shows calculated distances only. It does not constitute approval. Concurrence of CEHNC-OE-S is required to determine the applicable distance for a specific site.

In lieu of munition specific calculations, default values in accordance with DoD 6055.9-STD, Chapter 5, paragraph E.4 will be used for PWD and PSD.

Default PWD = 2500 ft
Default PSD = 2500 ft

TEAM SEPARATION DISTANCE (TSD)

K 50 = 31 ft (85 grams of cyclotol)
Default team separation distance = 200 ft

TSD = 200 ft

SIGNATURES:

Michelle Crull 8/24/99
Subject Matter Expert

William H. Zehrf. 24 Aug 99
CEHNC-ED-CS-S Branch Chief

Public Withdrawal Distance (PWD)

Joliet AAP

24 August 1999

MUNITION: 40 mm M433 HEDP

REQUESTED BY: Patti Berry

PREPARED BY: Michelle Crull, PhD, PE

This form shows calculated distances only. It does not constitute approval. Concurrence of CEHNC-OE-S is required to determine the applicable distance for a specific site.

In accordance with (IAW) OE Center of Expertise Interim Guidance Document 98-08, use of the range to no more than 1 hazardous fragment/600 sq ft as the PWD for accidental detonations requires written justification, a risk analysis, calculation of this distance by CEHNC-ED-CS-S, and concurrence of CEHNC-OE-S.

ACCIDENTAL DETONATIONS

Maximum Fragment Range = 305 ft

Range to No More Than 1 Hazardous Fragment/600 sq ft = N/A ft

Range to 0.9 psi Overpressure = 25 ft

IAW OE Center of Expertise Interim Guidance Document 98-08, the PWD for intentional detonations may not be less than the default distance provided in DoD 6055.9-STD or the maximum fragment range or the K328 overpressure distance.

INTENTIONAL DETONATIONS

Maximum Fragment Range = 305 ft

K328 Overpressure Range = 167 ft

The primary fragmentation characteristics used in the calculation of the values listed above were computed IAW CEHNC-ED-CS-S-98-1. The maximum fragment range was calculated using the maximum weight fragment and the initial velocity from these characteristics in the computer software TRAJ. The range to no more than 1 hazardous fragment/600 sq ft was calculated IAW CEHNC-ED-CS-S-98-2.

SIGNATURES:

Michelle Crull 8/24/99
Subject Matter Expert

William H. Zehrf. 24 AUG 99
CEHNC-ED-CS-S Branch Chief

APPENDIX D

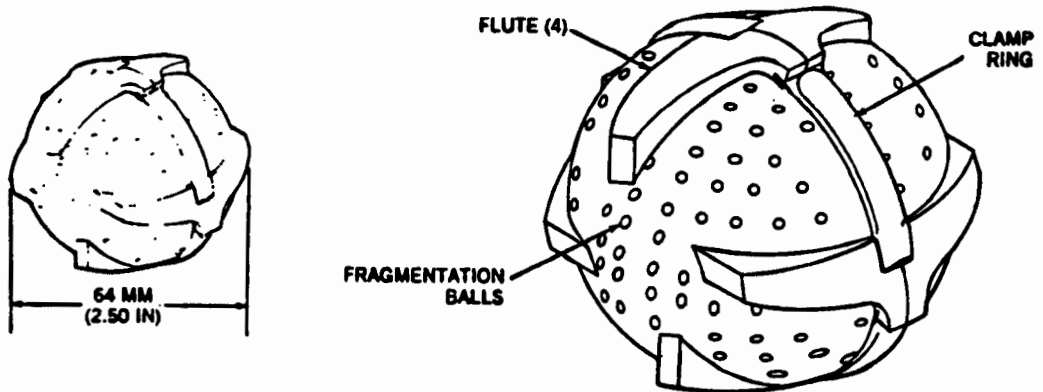
Submunition Data

JOLIET ARMY AMMUNITION PLANT
WILMINGTON, ILLINOIS

Assume all BLU-26/B and M39 are live.

**Do not handle or otherwise disturb any BLU-26/B or
M39.**

Blow-in-place all BLU-26/B and M39.



BLU-26/B, BLU-26 (T-1)/B, BLU-36/B,
BLU-36 (T-1)/B AND BLU-59/B BOMBS

Table 1. (U) Fuze/Bomb Combinations.

Bomb	Fuze			
	M219	M219E1	M218	M224
BLU-26/B	x	x		
BLU-26(T-1)/B	x			
BLU-36/B			x	
BLU-36(T-1)/B			x	
BLU-59/B				x
BLU-63/B		x		
BLU-63(T-1)/B		x		
BLU-63A/B		x		
BLU-86/B				x
BLU-86(T-1)/B				x
BLU-86A/B				x

UNCLASSIFIED

has two slots cut into the lower portion. A safety strap, which also has a slot in each end, fits around the bomb body and under the fuze assembly lever. Two projections on the wind tab fit through the slots of the fuze assembly lever and into each of the slots of the safety strap. The wind tab and safety strap hold the fuze assembly lever in place when the safety pin is removed prior to insertion of the bomb into the dispenser.

13-1.2 HAZARDOUS COMPONENTS.

Filler	Approx 2 pound white phosphorous
Detonator assembly	28 grains RDX and lead azide
Delay charge	20 grains
Primer M42	0.35 grain

13-1.3 FUNCTIONING. The bombs are loaded into the dispenser bomb base first. As the bombs leave the dispenser tube, air flow forces the wind tab up, disengaging it from the fuze assembly lever and safety strap. As the wind tab and safety strap are released, spring tension of the fuze assembly striker forces the fuze assembly lever up and off the fuze assembly. Removal of the lever allows the striker to impinge on the percussion primer and the pyrotechnic delay is started. After a 4-5 second delay, the detonator fires and dispenses the WP filler.

13-1.4 SAFETY PRECAUTIONS. General safety precautions regarding the approach, attack, and disposal of WP filled bursting munitions must be observed.

13-2 HIGH-EXPLOSIVE BOMB BLU-26/B WITH FUZE M219 OR M219E1, HIGH-EXPLOSIVE BOMB BLU-36/B WITH FUZE M218, AND HIGH-EXPLOSIVE BOMB BLU-59/B WITH FUZE XM224

Bomb BLU-26/B with fuze M219 or M219E1, bomb Blu-36/B with fuze M218, and bomb BLU-59/B with fuze XM224 are covered in this paragraph.

13-2.1 IDENTIFICATION.

13-2.1.1 TYPE.

The bombs BLU-26/B, BLU-36/B, and BLU-59/B (figure 13-4) are small, spherical shaped, high-explosive, internally fuzed, fragmentation-type submunitions that are dispensed from the bomb dispensers shown in table 13-1.

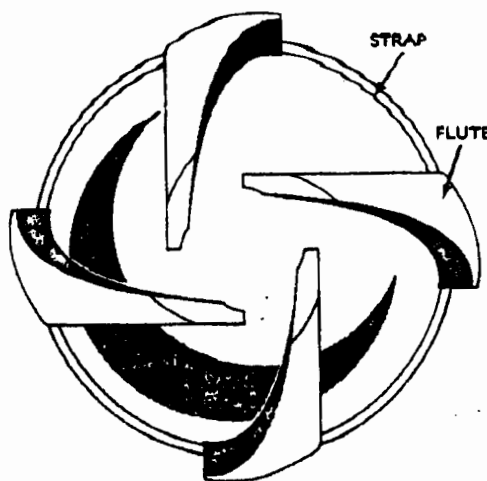
- The BLU-26/B is fuzed with the centrifugally armed, impact fired fuze M219 or M219E1.
- The BLU-36/B is fuzed with the centrifugally armed, random built-in delay fuze M218.
- The BLU-59/B is fuzed with the centrifugally armed, random built-in delay fuze XM224.

13-2.1.2 PAINTING AND MARKING.

The bomb bodies are painted olive drab, and are unmarked.

13-2.1.3 FITTINGS AND FEATURES.

- Externally the bombs are identical. Inter-



MU-L2416

Figure 13-4 Bomb BLU-26/B, BLU-36/B, or BLU-59/B—External View

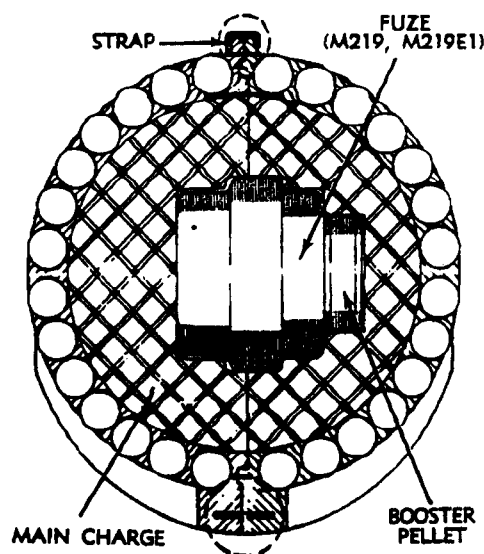
Table 13-1. Dispensing Systems for Bombs BLU-26/B, BLU-36/B, and BLU-59/B

System	Dispenser designation	Payload	
		Designation	Quantity
CBU-24/B	SUU-30/B	BLU-26/B	670
CBU-24/B (Mod)	SUU-30/B (Mod)	BLU-26/B	670
CBU-24A/B	SUU-30A/B	BLU-26/B	670
CBU-24B/B	SUU-30B/B	BLU-26/B	670
CBU-24C/B	SUU-30C/B	BLU-26/B	640
CBU-49/B (Mod)	SUU-30/B (Mod)	BLU-59/B	670
CBU-49A/B	SUU-30A/B	BLU-59/B	670
CBU-49B/B	SUU-30B/B	BLU-59/B	670
CBU-49C/B	SUU-30C/B	BLU-59/B	640
CBU-29/B (Mod)	SUU-30/B (Mod)	BLU-36/B	670
CBU-29A/B	SUU-30A/B	BLU-36/B	670
CBU-29B/B	SUU-30B/B	BLU-36/B	670
CBU-29C/B	SUU-30C/B	BLU-36/B	640
ADU-272A/B -----	-----	BLU-26/B	177*
ADU-272B/B -----	-----	BLU-26/B	177*
ADU-285A/B -----	-----	BLU-36/B	177*
ADU-285B/B -----	-----	BLU-36/B	177*

* Each bomb cluster.

nally they differ in their fuzing. Each bomb (figures 13-5 and 13-6) is a fluted sphere, $2\frac{3}{4}$ inches at the flute, and 0.92 pound in weight. A clamp ring encircles the sphere and holds the two hemispheres together.

- b. The bomb fuzes are mounted internally and are contained in a stepped cylindrical case. Externally the fuzes are similar in appearance. The fuze M219 has a dimple in the center of the case; the fuze M219E1 has a pimple in the center of the case; and the M218 and XM224 fuze cases are smooth. The configuration and general arrangement of fuzes M219 and M219E1 are shown in figures 13-6.1 and 13-6.2. A general arrangement and cross-section of fuzes M218 and XM224 are shown in figures 13-6.3 and 13-6.4.
- c. No external features are provided to indicate if the bombs are armed or unarmed when found outside of their dispenser.



MU-L2418-A 8

Figure 13-5 Bomb BLU-26/B—Cross Section

**Change 25
78.3**

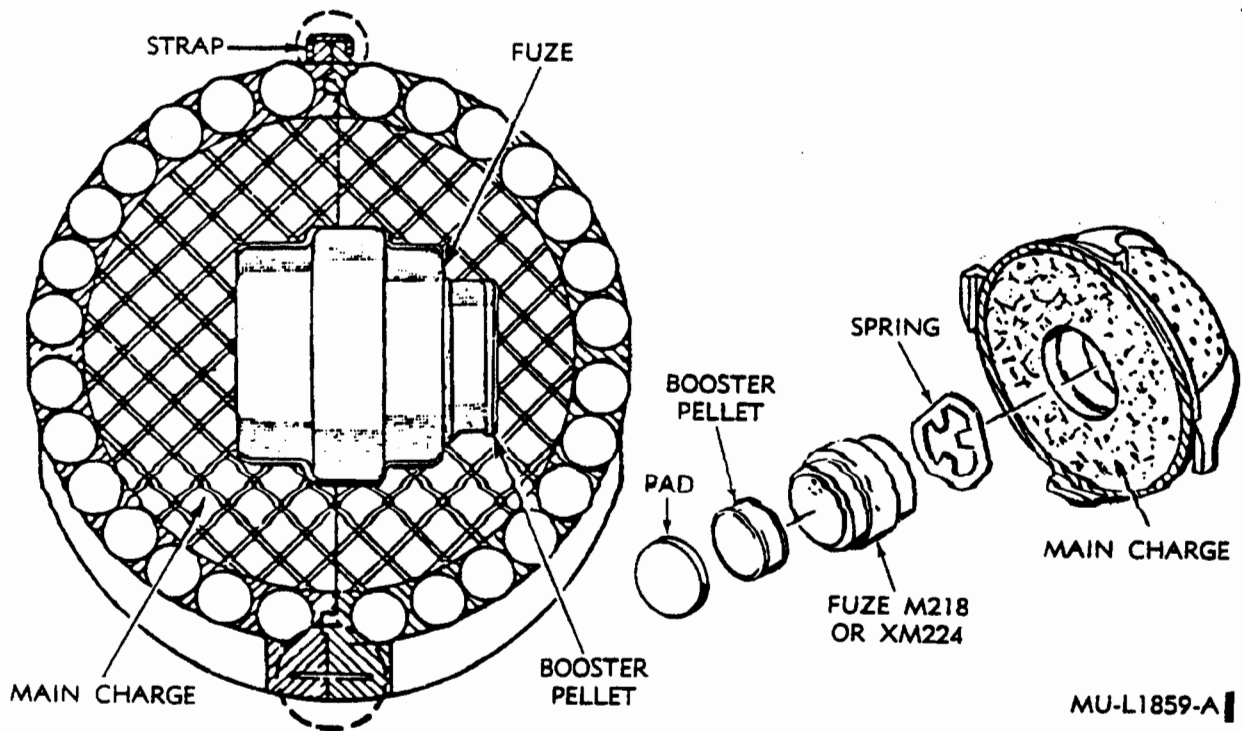


Figure 13-6 Bomb BLU-36/B or BLU-59/B—Cross Section

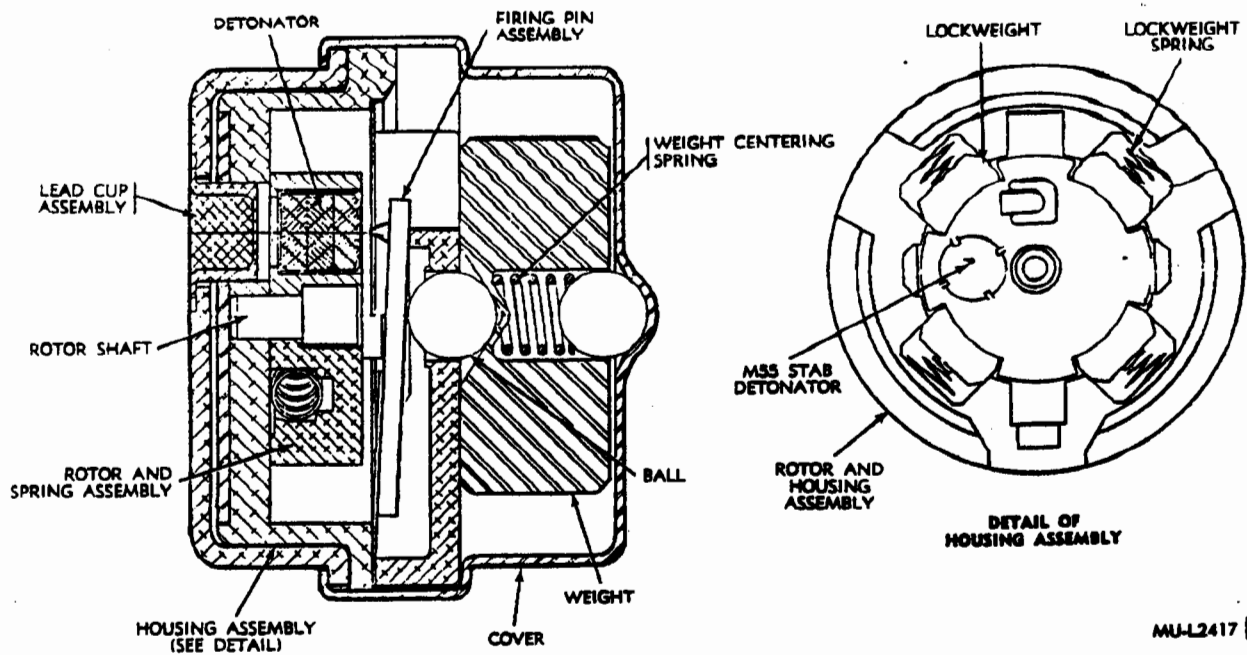
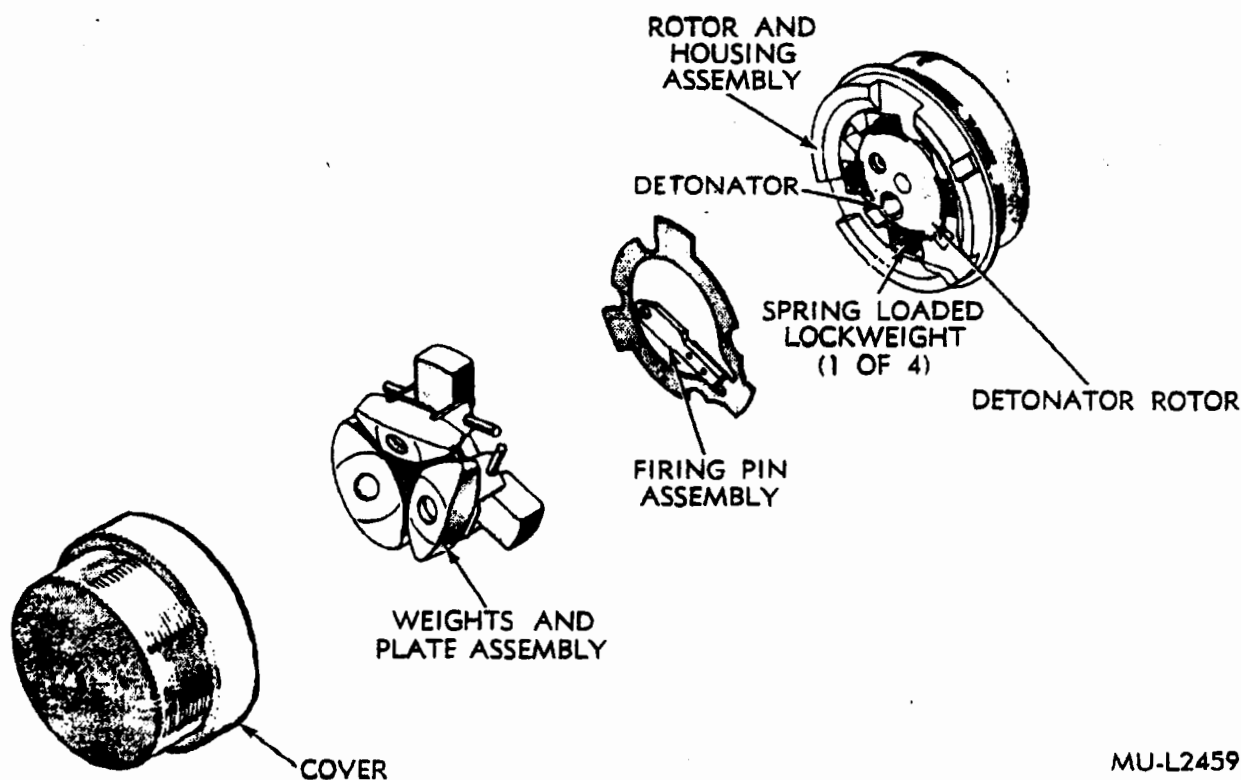


Figure 13-6.1 Fuze M219E1—Cross Section



MU-L2459

Figure 13-6.2 Fuze M219—Exploded View

- d. Fuze safety in the bombs BLU-26/B, BLU-36/B, and BLU-59/B is accomplished by an out-of-line detonator rotor which is held by four spring-loaded lockweights.

13-2.1.4 WEIGHTS. The bombs weigh approximately 1 pound.

13-2.1.5 MATERIALS.

- a. The bomb body is made of die-cast aluminum. Steel balls, embedded in the body, provide fragmentation.
- b. The stepped cylindrical fuze housing is made of steel and aluminum.

13-2.2 HAZARDOUS COMPONENTS.

The bombs BLU-26/B, BLU-36/B, and BLU-59/B contain approximately 0.186 pound of

explosives. Each consists of approximately 81 grams of cyclotol or composition B (main hemispherical charge) and a booster containing approximately 1.4 grams of RDX or PBX.

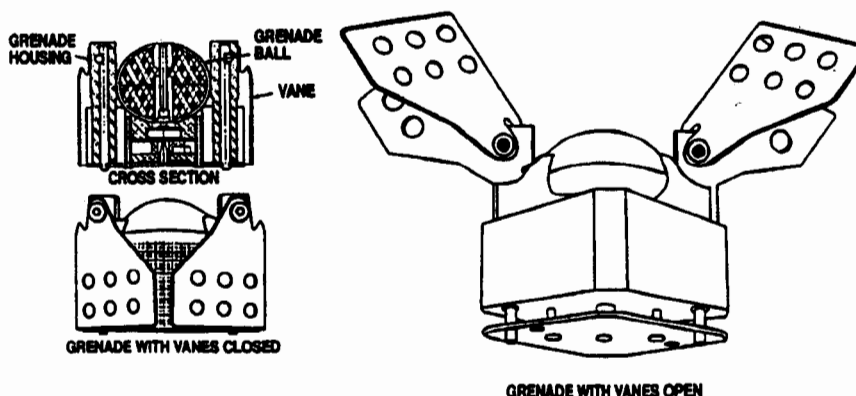
13-2.3 FUNCTIONING.

a. Bomb BLU-26/B.

(1) Fuze M219.

- (a) Prior to arming, the detonator rotor is held in the out-of-line position by four spring-loaded lockweights which fit into slots of the detonator rotor. In addition, the firing pin extends into the lock safe hole of the detonator rotor and is held in that position by three hammerweights which force the firing hammer against the leaf spring of the firing pin.

Change 25
7&5

GRENADE: GENERAL PURPOSE, M39U
AR 101394**Type Classification:****Use:**

To provide improved antipersonnel capability when loaded in 105mm cartridge M444.

Description:

The grenade M39 is an airburst munition which is expelled from the projectile body in flight. Upon surface impact, the explosive components are ejected upward for airburst. The grenade consists of a housing assembly, two vanes which extend in flight, pivoted on two D-shaped sear pins, a striker plate with firing pin, two striker plate guide rods which interlock the sear pins, ejection charge, delay detonator, and a two-piece steel ball filled with Composition A5. There are 18 grenades in the M444 cartridge.

Classification:

Standard A.

Tabulated Data:

Explosive ----- 23.55 g
Comp A5

Functioning:

When each grenade M39 is expelled from the projectile body, the vanes open and orient

the grenade by interaction of the air stream.

The D-shaped sear pins rotate with the vanes, and free the striker plate guide rods which allow the spring to extend the striker plate.

This action withdraws the firing pin from the rotor and a spring forces the rotor into a position where the primer is aligned with the ejection charge and the delay detonator. The grenade is now armed.

The vanes are held open by the air stream and striker plate guide rods.

When the grenade impacts, the firing pin is driven into the primer which initiates the ejection charge.

The ejection charge initiates the delay detonator and propels the steel ball upward.

The delay detonator is assembled with a delay element designed to detonate the steel ball approximately 4 to 6 feet above impact surface.

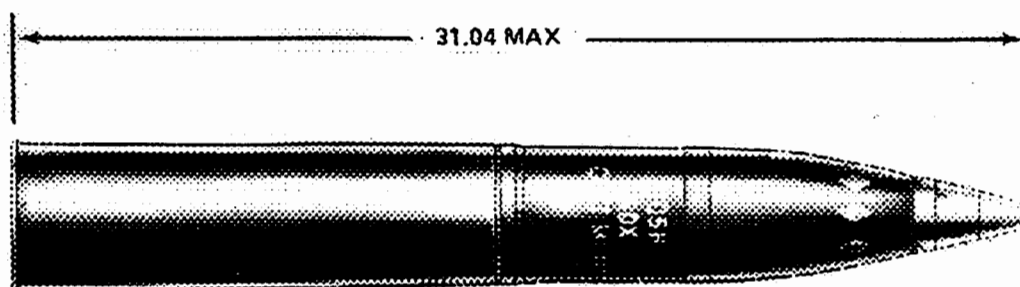
Drawing:

F8864945

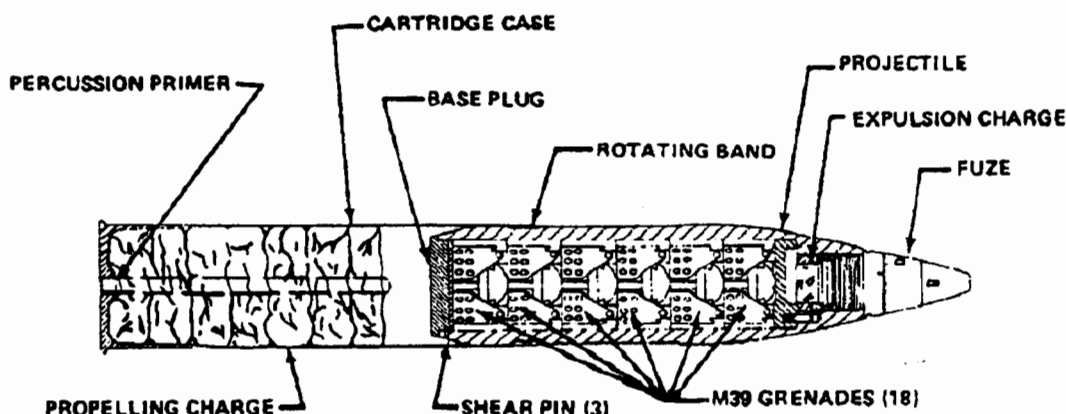
Reference:

TM 9-1300-251-20

CARTRIDGE, 105-MILLIMETER: HE, M444



AR199432



AR199431

Type Classification:

Std OTCM 37803 dtd 1961.

Use:

This cartridge is used to deliver a concentration of antipersonnel grenades.

Description:

The complete round consists of a projectile, a modified fuze, MTSQ, M548 or MT, M565, and a cartridge case. The projectile contains six layers of grenades with three grenades in each layer. The grenades are contained by a base plug attached to the projectile with three shear pins. A modified mechanical time and superquick or mechanical time fuze is installed in the nose of the projectile, and may be set to function at any time between 2 and 100 seconds. The modified fuzes incorporate an expulsion charge and are not interchangeable with unmodified fuzes of the same model. The

cartridge case contains a percussion primer and a propelling charge divided in increments to permit adjustment for the desired firing charge. The lip of the cartridge case is a free fit over the base of the projectile.

Functioning:

When the primer is detonated by the firing pin of the weapon, the flash from the primer ignites the propelling charge, producing gases which propel the projectile from the barrel of the weapon. The rifling in the barrel imparts spin to the projectile, stabilizing it in flight. The fuze, having been set to function at a predetermined time in flight, initiates the expulsion charge, ejecting the entire grenade load from the rear of the projectile. Centrifugal force disperses the grenades radially from the projectile line-of-flight. The M39 grenade is an airburst submissile which is expelled from its housing on impact and projected upward to burst at 4 to 6 feet above the ground.

Tabulated Data:

Complete round:
 Type ----- HE
 Weight ----- 42.0 lb
 Length ----- 31.04 in.
 Cannon used with ----- M2A1, M2A2,
 M49, M103,
 M137, and
 M137E1

Projectile:
 Body material ----- Forged steel
 Color ----- Olive drab
 w/yellow dia-
 monds and
 markings

Filler and weight:
 Number of grenades, M39 -- 18
 Explosive, Comp A5,
 each grenade ----- 23.55 grams
 Explosive, Comp. A5, -----
 each projectile ----- 0.93 lb
 Fuze ----- MT, M565 (mod-
 ified) or MTSQ,
 M548 (modified)

Cartridge Case:

Model	Mat'l	Wt (lb) (approx)
M14	Brass	5.9
M14B1	Steel, Drawn	5.4
M14B3	Steel, 5 pc spiral wrap	4.7
M14B4	Steel, 3 pc spiral wrap	4.7

Propelling charge:

Model ----- M67

Components:

Incre- ment No.	Prop Comp & Type	Web Size in. approx	Wt Oz approx	Perf.
1	M1, Type II	0.014	8.6	Single
2	M1, Type II	0.014	1.4	Single
3	M1, Type I	0.026	2.5	Multi
4	M1, Type I	0.026	3.8	Multi
5	M1, Type I	0.026	5.8	Multi
6	M1, Type I	0.026	8.8	Multi
7	M1, Type I	0.026	14.3	Multi

Weight, Total

Increments 1-7 ----- 2.83 lb

Percussion primer assembly:

	M28A2 M6I	M28B2 M6I
Primer		
Black		
powder	Cl 1, Spec MIL-P-223	Cl 1, Spec MIL-P-223

	(Note B)	(Note B)
Weight (lb)		
(primer)	0.00014	0.00014
(BP)	0.043	0.043
Body	Brass, Type 1	Steel, Type 2

Performance:

Using M52, M52A1 and M101/M101A1
 howitzers:

Charge	Muzzle (fps)	Velocity (mps)	Maximum (m)	Range (yd)
1	650	198.1	3510	3840
2	710	216.4	4110	4495
3	780	237.7	4860	5315
4	875	266.7	5950	6505
5	1020	310.9	7650	8370
6	1235	376.4	9380	10,260
7	1550	472.4	11,270	12,330

Maximum range ----- 11,270 m,
 12,330 yd
 Muzzle velocity ----- 472.4 m,
 1550 fps

Using M102 and M108 howitzers:

Charge	Muzzle (fps)	Velocity (mps)	Maximum (m)	Range (yd)
1	673	205	3700	4040
2	732	223	4300	4700
3	810	247	5200	5690
4	912	278	6300	6890
5	1066	325	8100	8500
6	1289	393	9600	10,500
7	1621	494	11,500	12,590

Maximum range ----- 11,500 m,
 12,590 yd
 Muzzle velocity ----- 494 m, 1621 fps

Temperature Limits:**Firing:**

Lower limit ----- -40°F (-40°C)
 Upper limit ----- +125°F (+52°C)

Storage:

Lower limit ----- -65°F (-53.8°C)
 Upper limit ----- +165°F (73.9°C)

*Packing ----- 1 round in fiber
 container; 2
 containers in
 wooden box

APPENDIX E

ICM DIG PROCEDURES

*JOLIET ARMY AMMUNIITON PLANT
WILMINGTON, ILLINOIS*

Dig Procedures for Anomaly Excavation in ICM areas

Reference. US Army Engineering and Support Center, Huntsville Basic Safety Concepts and Considerations for Ordnance and Explosives Operations, 22 May 2000

Reference Can be viewed at the following address:

<http://www.hnd.usace.army.mil/oew/policy/IntGuidRegs/igd00-03.pdf>

Paragraph 6-1.a. of the reference states "The usual method for uncovering buried UXO is to excavate by hand. Hand excavation is the most reliable method for uncovering UXO, but unless the UXO is very near the surface, hand excavation exposes more people to the hazard of detonation for a longer period of time than any other method. Hand excavation will be accomplished only by UXO qualified personnel."

Paragraph 6-1.b. of the reference states "Earth moving machinery (EMM) may be used to excavate buried UXO, if the UXO is estimated to be deeper than 12 inches. EMM shall not be used to excavate within 12 inches of an UXO. When excavation gets within approximately 12 inches of an UXO, hand excavation shall be used to uncover the UXO."

Background. By their nature, UXO operations/anomaly excavation are hazardous, and certain calculated risks must be taken; ingenuity, judgement, common sense, and above all the mastery of explosive ordnance disposal (EOD) techniques and observance of EOD principles will determine success or failure. Our UXO technicians must be alert at all times and be in observance of EOD safety precautions. EOD/UXO personnel are the most experienced and best qualified to perform these operations.

Specific Procedures for Anomaly Excavation.

- a. Do not dig directly on top of the anomaly. Start all excavations from the side of the anomaly. Carefully dig from the side until identification is made.
- b. Clear debris/dirt from subsurface anomaly only enough to permit identification of the anomaly and to apply the necessary UXO procedure.
- c. All submunitions will be blown in place.
- d. Move with slow deliberate motions; avoid abrupt moves.
- e. Permit no metal to metal contact with UXO.
- f. Avoid impacting, jarring, or striking UXO.
- g. Do not subject UXO to shock, rough handling, heat, or any other force.
- h. Observe electromagnetic radiation (EMR) precautions.
- i. Use plastic or wooden hand tools when digging within 3 inches of the anomaly.

HQDA LTR 385-00-1

DACS-SF (5 May 2000)

Expires 4 May 2002

SUBJECT: Improved Conventional Munitions and Submunitions

SEE DISTRIBUTION

1. Purpose. This letter --

- a. Restricts the use of improved conventional munitions (ICMs) and submunitions.
- b. Restricts the maintenance, characterization, and clearance of ranges and other areas that contain, or are suspected to contain, ICMs and submunitions.
- c. Provides minimum requirements for the control of hazards associated with the maintenance, characterization, and clearance of ranges and other areas that contain, or are suspected to contain, ICMs and submunitions.

This letter does not address non-ICM/submunition unexploded ordnance, which is addressed in reference "b."

2. Applicability. This letter applies to Active Army, Army National Guard, U.S. Army Reserve, Army civilian, Army contractors, and other Services using ranges controlled by the U.S. Army, in CONUS and OCONUS.

3. Proponent. The proponent of this letter is the Chief of Staff, Army. The Chief of Staff, Army has the authority to approve exceptions to this letter that are consistent with

controlling law and regulation. The Chief of Staff, Army may delegate the approval authority, in writing, to the Director of Army Safety.

4. References.

a. HQDA (DAMO-TRO) message 151835Z APR 96, subject: Ammunition Prohibited from Use during Training.

b. HQDA Numbered Letter 385-98-1, subject: Explosives Safety Policy for Real Property Containing Conventional Ordnance and Explosives.

c. AR 75-15, Responsibilities and Procedures for Explosive Ordnance.

d. AR 210-21, Army Ranges and Training Land Program.

e. AR 385-10, Army Safety Program.

f. AR 385-40, Accident Reporting and Records.

g. AR 385-63, Policy and Procedures for Firing Ammunition for Training, Target Practice, and Combat.

h. AR 385-64, U.S. Army Explosives Safety Program.

i. DA Pam 385-64, Ammunition and Explosives Safety Standards.

j. FM 21-16, Unexploded Ordnance (UXO) Procedures.

k. DoD 6055.9-STD, DOD Ammunition and Explosives Safety Standards.

l. DOD Policy to Implement EPA's Military Munitions Rule, 1 Jul 98.

5. Explanation of abbreviations and terms.

a. Characterization - the process of scanning (visually and through the use of electromagnetic detection devices) the surface or subsurface of an area to determine locations, types, depths, extent, and density of ICMs and submunitions.

b. Clearance - the identification, removal, and disposal of ordnance and explosives.

c. Improved conventional munitions - munitions characterized by the delivery of two or more antipersonnel, antimateriel, or antiarmor submunitions by a parent munition.

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d. Range maintenance - maneuver damage repair, repair of environmental damage to ranges and training facilities, and training area reconfiguration.

e. Submunition - any munition that, to perform its task, separates from a parent munition.

f. Surface danger zone (SDZ) - the ground and airspace designated within the training complex (to include associated safety areas) for vertical and lateral containment of projectiles, fragments, debris, and components resulting from the firing, launching, or detonation of weapon systems to include explosives and demolitions.

6. Responsibilities.

a. The Assistant Secretary of the Army (Installation and Environment) (ASA(I&E)) is responsible for establishing overall Army environment, safety, and occupational health policy. The ASA(I&E) will exercise oversight of all aspects of environment, safety, and occupational health statutory compliance. These responsibilities are carried out through the Deputy Assistant Secretary of the Army (Environment, Safety and Occupational Health).

b. The Director of Army Safety (DASAF), Office of the Chief of Staff, U.S. Army, administers and directs the Army safety program as specified in AR 385-10. The DASAF is responsible for --

(1) Establishing risk assessment criteria for ICM and submunition clearance activities.

(2) Establishing, with the Director of Training (DAMO-TR), Office of the Deputy Chief of Staff for Operations and Plans (ODCSOPS), policy on the restriction of ICMs and submunitions.

(3) Coordinating with appropriate Army Staff elements and Major Commands (MACOMs) and reviewing requests for waivers to the Army prohibition on maintenance, characterization, or clearance of ranges or other areas containing ICMs and submunitions.

(4) Providing joint, with the ODCSOPS (DAMO-TR), approval of waivers to the Army prohibition on maintenance, characterization, or clearance of ranges or other areas containing ICMs or submunitions.

c. The Deputy Chief for Operations and Plans (DCSOPS) is responsible for --

(1) Developing policy for training ranges and other training facilities required to support training (AR 210-21).

(2) Reviewing requests for waivers to the Army prohibition on maintenance, characterization, or clearance of ranges or other areas containing ICMs or submunitions and providing joint (with the DASAFA) approval for waivers to the Army prohibition.

d. The Judge Advocate General (TJAG) is responsible for providing advice on statutory and regulatory requirements affecting ordnance and explosives clearance activities.

e. The Deputy Chief of Staff for Logistics (DCSLOG) is responsible for --

(1) Developing policy and guidance for the Army explosive ordnance disposal (EOD) program.

(2) Reviewing, and providing a position on, requests for waivers to the Army prohibition on maintenance, characterization, or clearance of ranges or other areas containing ICMs or submunitions.

f. The Assistant Chief of Staff for Installation Management (ACSIM) is responsible for providing guidance on the application of environmental policy for ordnance and explosives clearance plans and procedures.

g. The U.S. Army Technical Center for Explosives Safety (USATCES) is responsible for --

(1) Supporting ODASAFA in evaluating requests for waivers to the Army prohibition on maintenance, characterization, or clearance of ranges or other areas containing ICMs or submunitions.

(2) Providing guidance on historical records searches to determine past usage of ICMs or submunitions.

(3) Maintaining an inventory of Army property and Formerly Used Defense sites (FUDS) containing ICMs and submunitions.

h. Commanders with responsibility over ranges or other areas known or suspected of containing ICMs or submunitions will --

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SUBJECT: Improved Conventional Munitions and Submunitions

(1) Ensure ODCSOPS (DAMO-TR), ODASAF, ODCSLOG (DALO-AMA) and USATCES are informed of any ranges or other areas known or suspected of containing ICMs or submunitions.

(2) Ensure ranges or other areas known or suspected of containing ICMs or submunitions are clearly marked and access to these areas is restricted and controlled.

(3) Prohibit all activities on ranges or other areas known or suspected of containing ICMs or submunitions until a waiver, approved by the DASAF and the DCSOPS (DAMO-TR), is obtained.

(4) Follow the procedures contained in this document for requesting waivers to the prohibition on maintenance, characterization, or clearance of ranges or other areas known or suspected of containing ICMs or submunitions.

7. Policy.

a. The firing, dropping, or disposing of ICMs or submunitions for training and demonstration by Army units or other Services, to include foreign national units, on Army ranges or other areas controlled by the Army is prohibited. This prohibition does not include ICM or submunition proof testing or testing, for intelligence purposes, of foreign munitions that contain submunitions. However, when such tests are performed, the use of submunitions will be both limited to the minimum number required and restricted to specifically designated target or impact areas.

b. The designation of areas for ICM or submunition proof testing or testing, for intelligence purposes, of foreign munitions that contain submunitions requires the approval of the MACOM Commanding General.

(1) The MACOM shall notify the ODASAF, USATCES, ODCSLOG (DAMO-AMA), and OACSIM of all areas so designated.

(2) Areas so designated shall be limited to ICM or submunition proof testing or testing, for intelligence purposes, of foreign munitions that contain submunitions; all other uses will be prohibited.

(3) A complete inventory of all ammunition and explosives tested in such areas shall be maintained. The inventory will include the type, full nomenclature, and number, of ICMs or submunitions tested; the date of the test; and the agency conducting the test.

(4) Installations with ICM or submunition test ranges shall develop procedures to ensure that entry into test areas in which ICMs or submunitions have been fired is restricted and access is strictly controlled and to ensure the clearance of the area following testing.

c. Ranges or other areas known or suspected of containing ICMs or submunitions will be clearly marked to identify the hazard and access shall be restricted. If the area known or suspected of containing ICMs or submunitions is a subset of a larger area known not to contain ICMs or submunitions, access to the larger (non-ICM/submunition) area may be granted by the installation Commander under the following conditions (these are in addition to other range entry or UXO safety requirements):

- (1) there is a compelling need for personnel to enter the larger area;
- (2) there are no activities taking place in the restricted (ICM/submunition) area;
- (3) the area known or suspected of containing ICMs or submunitions is clearly marked, access to this area is restricted, and all personnel authorized to enter the non-ICM/submunition area are provided an explosives safety briefing that identifies the types of ICMs and submunitions that could be encountered and action that should be taken if they discover ICMs or submunitions; and
- (4) entry into the larger area is coordinated with range and safety personnel.

d. Before access is granted to range impact areas, the installation range operations office will determine, to the extent possible based on range records and procedures, whether the range contains or is suspected of containing, ICMs or submunitions. Access to areas containing or suspected of containing ICMs or submunitions is prohibited unless permitted under a waiver approved in accordance with paragraph 8. In addition, Range Operations, in coordination with installation safety and EOD representatives, will determine, and monitor implementation of, safety controls required for personnel access. Personnel permitted to enter any area containing or suspected of containing ICMs or submunitions will be fully apprised of the potential dangers and the safeguards to be exercised. When necessary, personnel will have the appropriate escorted.

e. Ranges or other areas that contain, or are suspected to contain, ICMs or submunitions will not be entered by anyone (including Government military or civilian personnel, military EOD personnel, or contractor personnel for range maintenance, characterization, or clearance activities) without a waiver approved in accordance with paragraph 8.

f. The suspected presence of ICMs or submunitions on Army ranges or other areas will be reported immediately through command channels to the DCSOPS (DAMO-TR), ODASAF, ODCSLOG (DALO-AMA), and USATCES. At a minimum, the report will include location, type of ICM or submunition suspected, the boundaries (by

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coordinates) of the area suspected to contain ICMs or submunitions, the suspected source (e.g., weapon system and event in which the ICM or submunitions were most likely used), the date of discovery, a point of contact, and, if available, digital pictures of the discovered item. Local supporting EOD units should be notified.

g. There may be situations that present a compelling need to clear ICMs or submunitions from a range or other area, or to enter, for purposes of range maintenance, areas containing or suspected of containing ICMs or submunitions. In such situations, a waiver to the prohibition on maintenance, characterization, or clearance of ranges or other areas containing ICMs or submunitions will be considered on a case-by-case basis. Waivers will only be approved when the increased explosives safety risk associated with exposure to ICMs or submunitions is fully justified (e.g., the presence of ICMs or submunitions poses an unacceptable, uncontrolled, unavoidable threat to DoD personnel or members of the public or when ICM or submunition clearance or range maintenance is required as a prerequisite to a mandated transfer of real property).

h. Maintenance, characterization, and clearance on ranges or other areas involving munitions that are not considered ICMs or submunitions but that have sensitive mechanisms for initiating the explosives firing mechanism (e.g., M83 4 pound fragmentation "Butterfly" bomblet or the M54 series 4 pound incendiary bomb) are not addressed by this policy. However, plans for maintenance, characterization, or clearance of such munitions can be evaluated at HQDA (ODASAF).

i. In the event emergency destruction is required of an ICM or submunition located outside of a range (or other area associated with ICMs or submunitions), emergency destruction by Army EOD units may be authorized, without HQDA approval, as specified in reference "I."

8. Waivers.

a. Requests for waivers may be submitted by the Installation, Activity, or U.S. Army Corps of Engineers District Commander with responsibility for the proposed activity. The waivers will be forwarded (four copies) through command channels (approval at each level of command is required) to the ODASAF.

b. Requests for waivers will include the following information, in the following order.

(1) The purpose and scope of the proposed activities to be conducted under the waiver.

(2) The name and location of the areas in which the proposed activities (i.e., maintenance, characterization, or clearance) will be conducted. Provide maps --

- (a) showing the regional location of the site;
- (b) showing the boundaries of the area(s) for which the waiver is requested;
- (c) showing, for Army-controlled property to be released outside DoD, the boundaries of the parcels to be released and listing the anticipated reuse of each parcel and any land use restrictions to be placed on the property (plans for the release of such property must be submitted for review and approved by the Department of Defense Explosives Safety Board (DDESB));
- (d) listing, for property not under DoD control (such as FUDS), the past and current use and, if known, the anticipated reuse of each area to undergo clearance and any existing land use restrictions applicable to the property.
- (e) listing the planned clearance depths and provides site-specific data to support the depth of clearance determination.

(3) Alternatives to the proposed activities specified in (1), above, and justification for selection of the proposed activities over these alternatives.

(4) A description of the use of the site that led to presence of ICMs or submunitions. This description can consist of extracts from Inventory Project Reports, Preliminary Assessments, Historical Records Searches, Archive Search Reports, site inspections, safety surveys, Engineering Evaluations/Cost Analyses, or other appropriate sources.

(5) Characterization of the terrain - with regard to soil, topography, and vegetation factors that may impact ordnance and explosives detection and recovery - for areas for which the waiver is requested. Delineate terrain characterization on site maps.

(6) Detailed information with regard to known or suspected ICMs and submunitions in areas for which the waiver is requested. This information should identify the type, location, depth, and density of ICMs and submunition and should be annotated on a site map.

(7) Information with regards to known or suspected unexploded ordnance (non-ICM/submunition) in areas for which the waiver is requested. This information should identify the type, location, depth, and density of such unexploded ordnance and should be annotated on a site map.

(8) A description of technology and methods to be used to detect, recover, and destroy recovered unexploded ordnance, including ICMs and submunitions. When describing the technology and methods, address capabilities and limitations (to include those imposed by terrain and soil type) and provide a statement specifying the smallest

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item the equipment is capable of detecting at the detection depth.

(9) The number, composition, training, experience, and certifications of supervisors and members of the work teams that will be within the areas for which the waiver is requested.

(10) An in-depth explosives safety risk analysis detailing the hazards of, and safety controls (including personal protective equipment) for, the proposed activities. Specific attention will be paid to the types, quantities, and locations of ICMs and submunitions potentially encountered (based on site- and munition-specific activities, hazards, and controls). The risk assessment will be approved at the appropriate level within the requestor's chain of command.

(11) Quantity-distance (Q-D) maps for each area for which the waiver is requested. (Scaled maps of 1 inch equals not more than 400 feet are preferred; a larger scale is acceptable if distances can be shown with accuracy. If unscaled maps are used, then the maps must label distances). Maps will indicate the following--

(a) The area exclusion zone, the SDZ used to separate work teams, and the SDZ to be employed in destruction of ICMs and submunitions. Identify every inhabited building, occupied area, and public traffic route inside the exclusion zone or SDZs and describe measures to be taken to eliminate or minimize risk for exposures within the exclusion zone and SDZs.

(b) The location of magazines for the storage of demolition explosives and recovered ordnance and explosives.

(12) Summarize EOD, Technical Escort Unit (TEU), and contractor support. When military EOD units are involved in the range clearance activities, their portion of the operational plan will be approved by the EOD unit's chain of command.

(13) A description of quality control and quality assurance procedures, standards, and pass/fail criteria.

c. Whenever possible, waiver requests should be submitted at least sixty days prior to the date for which initiation of the proposed activities is requested. Coordination with the ODASAF or the ODCSOPS (DAMO-TR) prior to initiating the waiver request is recommended.

d. The ODASAF will coordinate the request for waiver with the HQDA ICM Working Group (ODASAF, ODCSLOG, and ODCSOPS) and others as required. Approval, if granted, will be provided jointly by the DASAF and ODCSOPS (DAMO-TR).

e. If, after initiating activities under a waiver, any of the following conditions occur, activities shall be stopped and the commander will submit, using the procedures prescribed in paragraph 8a, an amended request for waiver. Commanders should coordinate with the ODASAF or the ODCSOPS (DAMO-TR) to determine if, based on the scope of the change in conditions, approval of the amendment can be expedited.

(1) ICMs or submunitions of a type not specified in the current approval are encountered. The amended request for waiver will update information affected by the change. At the minimum, the amended request for waiver will update, or indicate no change to, the information required in paragraphs 8b(2)(d), 8b(6), and 8b(8)-(11).

(2) Additional areas require maintenance, characterization, or clearance. The amended request for waiver will specify the reason for the change and update information affected by the change. At the minimum, the amended request for waiver will update, or indicate no change to, the information required in paragraphs 8b(2)-(7) and 8b(11). (Work may continue in areas as approved in the initial waiver provided safety distances are not encroached.)

(3) The scope of work or work techniques change. The amended request for waiver will specify the reason for the change and update information affected by the change. At the minimum, the amended request for waiver will update, or indicate no change to, the information required in paragraphs 8b(1)-(3) and 8b(8)-(13).

(4) The number or composition of the characterization teams, clearance teams, or EOD, TEU, or contractor support changes. The amended request for waiver will specify the reason for the change and update information affected by the change. At the minimum, the amended request for waiver will specify the reason for change and update the information required in paragraphs 8b(9) and 8b(12).

9. Hazard control requirements for maintenance, characterization, or clearance of ranges or other areas.

a. Operations will be conducted in a manner that exposes the minimum number of people to the smallest quantity of explosives for the shortest period of time.

b. All work activities will be coordinated with and have the approval of all levels of commands and all Services involved.

c. All work activities will be conducted in accordance with the controls outlined in

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approved ordnance and explosives safety and health planning documents (e.g., explosives safety risk analyses, hazard analyses, and site safety and health plans).

d. Only qualified UXO personnel may enter and conduct maintenance, characterization, or clearance in areas containing, or suspected of containing, ICMs or submunitions. Qualified UXO personnel are defined as U.S. citizens who meet the following requirements:

(1) Graduated from the U.S. Army Bomb Disposal School, Aberdeen Proving Ground, MD; the U.S. Naval EOD School, Indian Head, MD; the U.S. Naval EOD School, Eglin AFB, FL; the EOD Assistant Course, Redstone Arsenal, AL; the EOD Assistant Course, Elgin AFB, FL; or a DOD-certified UXO qualification course.

(2) Have more than five years combined active duty military EOD and contractor UXO experience.

e. The qualified UXO personnel involved in maintenance, characterization, or clearance of ranges or other areas containing, or suspected of containing, ICMs or submunitions will receive training in the hazards of the specific ICM or submunition specified in the waiver request and the procedures to control those hazards.

f. Minimum team separation distance (to protect against unintentional detonation) will be based on the maximum credible event. If the maximum credible event is the unintentional detonation of a submunition, the team separation distance will be the largest of the following:

(1) 200 ft.

(2) The distance $D = KW^{1/3}$, using $K = 50$, plus a 50% safety factor.

(3) The maximum fragment throw distance with the potential for resulting in skin penetration or an impact energy of 58 ft-lbs (whichever criteria is appropriate for the munition under consideration), plus a 50% safety factor. Maximum fragment throw distance with the potential for resulting in skin penetration will be calculated in accordance with the procedure outlined in the appendix to this letter.

g. Whenever possible, ICMs or submunitions encountered will not be contacted or touched, but will be blown-in-place. Prior to destruction, all personnel will be removed, at a minimum, beyond the specified destruction SDZ. The SDZ for blow-in-place locations will be determined using distances described in paragraph 5-7c(2)(b) of DA Pam 385-64 or provided by DDESB-approved reduction methods or engineering controls.

h. Any explosive-related incident involving injury to personnel will be immediately reported in accordance with AR 385-40. Upon the occurrence of such an incident, activities will be stopped until a review and validation of procedures has been completed and approved by the Commander with responsibility for the activities.

i. The ODASAF and the ODCSOPS (DAMO-TR) will be notified, in writing, upon conclusion of work activities. This notification will include an after-action report detailing the type and number of ICMs and submunitions recovered; the location, depth, and areal dispersion of the ICMs and submunitions; the disposition of the ICMs and submunitions; and any safety concerns associated with the work activity.

(DACS-SF)

Louis Caldera
Secretary of the Army

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Appendix

Department of Defense Explosives Safety Board Approved Procedures for Calculation of Skin Penetration for Improved Conventional Munition and Submunition Team Separation Distance

The following procedure has been approved by the Department of Defense Explosives Safety Board for calculating maximum fragment throw distance with the potential for resulting in skin penetration.

From the Walker-Duncan Model, $p = \frac{1}{1 + e^{-(a-b*x)}}$ (1)

where:

p = probability of skin penetration

a and b are empirically-fitted constants

$$x = \ln\left(\frac{m * v^2}{A}\right) \quad (2)$$

m and A are fragment mass and cross-sectional area (in units of gm and cm²) and depend on the specific submunition

v , velocity in m/s

Using $p = 0.5$, $v = 130 \sqrt{\frac{A}{m}}$ (3)

Use equation (4) to determine the team separation distance for which the fragment velocity equals that of equation (3).

$$v = v_o * e^{-(12k_v R_f)} \quad (4)$$

where v_o = initial (maximum) fragment velocity

R_f = standoff distance

W_f = fragment weight

**Amendment to Request for Waiver to the Army Prohibition on
Characterizing,
Maintaining, & Clearing Areas of Ranges Containing Submunitions
or Improved Conventional Munitions
for Joliet Army Ammunition Plant
Ordnance Removal Action
and
Site Characterization
Load, Assemble and Pack facility
Sites L2, L3, L11, L16, L21, and L34**

**JOLIET ARMY AMMUNITIOIN PLANT
WILMINGTON, ILLINOIS**

May 2006

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Appendix BRISK ANALYSIS

Appendix CFRAGMENT CALCULATIONS

Appendix DSUBMUNITION DATA

1.0 PURPOSE AND SCOPE

1.1 General

This amendment to ICM/Submunition waiver request was prepared by the U.S. Army Engineering and Support Center, Huntsville (USAESCH) to address the Ordnance Removal Action (RA) and Site Characterization (SC) activities that will be conducted at sites L2 and L3 of the Joliet Army Ammunition Plant (JAAP) located outside Wilmington, Illinois. The U.S. Army Industrial Operations Command (IOC) requested the activities and are funding this action under their Industrial Lease Program.

1.2 JAAP Facility History

For JAAP facility history, please refer to the specific information contained in the *Request for Waiver to the Army Prohibition on Characterizing, Maintaining, & Clearing Areas of Ranges Containing Submunitions or Improved Conventional Munitions for Joliet Army Ammunition Plant Ordnance Removal Action and Site Characterization Load, Assemble and Pack Facility Sites L2, L3, L11, L16, L21, and L34; Joliet Army Ammunition Plant, Wilmington, Illinois, 13 August 1999*.

2.0 REASON FOR REQUESTING WAIVER

This amendment waiver is requested due to a change in work techniques to be performed during RA activities at sites L2 and L3 (See paragraph, 9.2 5). Sites L2 and L3 are suspected to be contaminated with BLU-26/B submunitions. We request this waiver be approved for both sites. Both sites L2 and L3 will ultimately be turned over to the United States Department of Agriculture for recreational use.

3.0 NAME AND LOCATIONS OF AREAS

The JAAP is a former U.S. Army munitions facility located on approximately 23,542 acres in Will County, Illinois (see Figure 1 of Appendix A). For additional information, please refer to the specific information contained in *Request for Waiver to the Army Prohibition on Characterizing, Maintaining, & Clearing Areas of Ranges Containing Submunitions or Improved Conventional Munitions for Joliet Army Ammunition Plant Ordnance Removal Action and Site Characterization Load, Assemble and Pack Facility Sites L2, L3, L11, L16, L21, and L34; Joliet Army Ammunition Plant, Wilmington, Illinois, 13 August 1999*. The facility has two

distinct operational areas divided by State Route 53: the approximate 14 square mile explosives manufacturing (MFG) area west of Route 53; and the approximate 22 square mile Load-Assemble-Pack (LAP) area east of Route 53 contains both sites L2 and L3.

A regional map showing the regional location of the JAAP within the state of Illinois is presented in Figure 1 of Appendix A

An overall site map is presented in Figure 2 of Appendix A. This figure shows the RA/SC sites and the magazine storage area.

Planned land uses for the JAAP sites include the assignment of sites L2 and L3 to the U.S. Department of Agriculture for future recreational use.

Site	Size	Use	Depth of Clearance	RA or SC
L2	29ac	Explosive Burning Ground	Depth*	RA
L2	27ac	200' Perimeter	1'	RA
L3	15ac	Demo Ground	Depth*	RA
L3	24ac	200' Perimeter	1'	RA

*Remediation activities will continue until magnetic anomalies are no longer detected.

4.0 ALTERNATIVES TO PROPOSED ACTIVITIES.

The activities proposed in Section 2.0, lists the additional activities that will be required when the Explosive Safety Submission (ESS) is approved. The proposed removal alternatives are selected on the default clearance depths specified in DOD 6055.9 STD for the anticipated future land use. The proposed characterization alternatives will be used to justify future removal alternatives, if necessary.

5.0 DESCRIPTION OF THE USES OF THE SITES THAT LED TO THE PRESENCE OF ICM/SUBMUNITIONS

The data presented below was obtained during previous archival searches performed in support of past remedial investigations, feasibility studies, and remedial designs. A brief description of why submunitions are believed or known to exist at the sites is also presented. The actual types

of Ordnance and Explosives (OE) contamination associated with each RA and SC site is presented in Table I of this waiver request.

1. Site L2: Site L2 is the former explosives burning grounds where ordnance, explosives and small munitions were burned on six gravel pads and three popping furnaces. The popping furnaces were used for the burning of small munitions. This site is suspected of containing BLU-26/B's.
2. Site L3: Former JAAP personnel and aerial photographs indicate that L3 was used for the burning of combustible refuse and munitions crates. However, soil sampling within this site has identified soils and ground water contaminated with explosives and heavy metals, indicating the potential for former OE burning and disposal. This site is suspected of containing BLU-26/B's.

5.1 Archival Search Data

Table 1 presents a listing of the munitions and components manufactured or handled within the L2 and L3 areas at the JAAP. This table was created from a similar table presented in the JAAP Environmental Baseline Statement for Transfer (EBST) generated for the U.S. Army by a contractor. Table 1 below is a compilation of the munitions and components that were either manufactured, handled, stored, tested, etc. at each of the RA or SC sites addressed by this submission.

TABLE 1: MUNITIONS/COMPONENTS MANUFACTURED/HANDLED

MUNITION/COMPONENT	AREA(S)	COMMENT
Large Caliber Munitions		
155mm, Shrapnel (MK I)	L2/3	
Medium Caliber Munitions		
90mm, HE-T (M7 I E 1)	L2/3	
75mm APC-T (M6 I A 1) w/fuze BD (M66A 1)	L2/3	
37mm, TP (M63 Mod 1)	L2/3	

MUNITION/COMPONENT	AREA(S)	COMMENT
Mines		
Mine, Antitank (M4)	L2/3	
Mine, Antitank NM (M5)	L2, L3,	
Dispensers and Submunitions		
BLU-26/B	L2/3	
Fuzes		
Fuze, MT (M43A3 and M43A4)	L 2/3	
Fuze, BD (M66, M66A I and M68)	2/3	
Fuze, Proximity (M517) arming mechanism	L2	Destroyed in popping furnace
Fuze, Antitank Mine (M 1, M 1 A1, M I A2 and M5)	L2/3	
Fuze, Antitank Mine NM, Practice T-3131)	L2/3	
Primers and Boosters		
Primer (M1A2)	L2/3	
Primer, Percussion (M22A2)	L /3	
Primer (M28A2&3, M3 I A2, M40A 1, M46-49)	L2	
MUNITION/COMPONENT	AREA(S)	COMMENT
Mortars and Rockets		
81 mm Mortar, BE w/o fuze	L2/3	Loaded (L9), tested and reworked
4.5 inch Rocket (m 16)	L2/3	
Adapter and Booster (MKIII AM2)	L2/3	

6.0 CHARACTERIZATION OF TERRAIN

(Delineated on the site maps included in Appendix A, For additional information, the reader is directed to the specific *Request for Waiver to the Army Prohibition on Characterizing, Maintaining, & Clearing Areas of Ranges Containing Submunitions or Improved Conventional Munitions for Joliet Army Ammunition Plant Ordnance Removal Action and Site Characterization Load, Assemble and Pack Facility Sites L2, L3, L11, L16, L21, and L34; Joliet Army Ammunition Plant, Wilmington, Illinois, 13 August 1999*)

Generally the areas are flat or mounded from previous demolitions operations. Vegetation is either sparse or grass covered. Site L3 contains a creek.

7.0 ORDNANCE AND EXPLOSIVES CHARACTERIZATION (OTHER THAN ICM/SUBMUNITIONS)

Table 1 above identifies ordnance used at the areas addressed in the amendment waiver request. Sites L2 and L3, are suspected of containing submunitions. Concentrations or depths of ordnance are not known.

7.1 Soil Sampling

While explosive contamination was located in soil and ground water samples taken from all of the RA and SC sites addressed by this waiver request, none of the samples have indicated the presence of explosive soils within the sites addressed by this amendment waiver request.

8.0 ORDNANCE AND EXPLOSIVES CHARACTERIZATION (ICM/SUBMUNITIONS)

Table 1 above identifies ordnance used at sites L2 and L3 addressed in this amendment waiver request. Both L2 and L3 are suspected of containing submunitions. Concentrations or depths of ICM/submunition are not known.

9.0 CLEARANCE TECHNIQUES

9.1 Introduction

This section presents information concerning removal of OE from the various sites at JAAP. Included are discussions of the methods of detection, capabilities/limitation of the method, the process that will be used to determine that ordnance scrap is free of explosive hazards, and the deposition of the ordnance scrap removed from the site, or generated by the clearance activities. The procedures included in this section will directly apply to each of the OE removal sites addressed by this amendment waiver request. Additionally, the OE investigation and disposal procedures referenced will also be used for the OE sampling and characterization operations at sites L2 and L3.

9.2 OE Detection and Removal

UXO personnel will use the Schonstedt GA-52Cx Heliflux magnetometer (52 CX) for the location of ferrous anomalies and the Whites Spectrum XLT (XLT) to locate non-ferrous anomalies. The depth of detection for a given item is dependent upon the size and orientation of the target item, as well as the characteristics of the soil. Prior to the use of both the 52 CX and the XLT at the JAAP facility, a test plot will be established for testing these instruments and the geophysical surveying and mapping (GS&M) equipment. This test plot will be established using inert OE items buried at the depths specified by the USAESCH in the SOW. Both the 52 CX and the XLT are capable of detecting the BLU-26/B at one foot. Daily response checks using the test plot will be documented by the UXOQCS who will ensure site personnel adjust and response check the instruments IAW this plan and the manufacturer's instructions. If an instrument does not respond correctly, and field maintenance fails to correct the problem, that instrument will be tagged as inoperable and removed from service. Replacement equipment will be tested in the same manner as outlined above.

The use of the detection technologies presented may be limited in their application to the explosives removal sites due to the degree of vegetation growth within some of the sites. Therefore, vegetation removal/burning will be conducted as needed by the OE removal teams. It is anticipated that some degree of vegetation removal will be required within each grid. **Grass and brush will be burned if at all possible in any site suspected of containing BLU-26/B's;** otherwise, vegetation will be removed to within six inches of the surface and tree limbs will be removed to a height of six feet to allow for the effective application of the detection technologies. No trees greater than three inches in diameter will be cut down without the prior approval of the USAESCH. UXO encountered during vegetation removal will be flagged with two-crossed red pin flags, and numbers reported to the SUXOS.

Once vegetation has been removed/burned from the project grids, it is not anticipated that there will be any further limitations of the OE detection methods or technologies aside from the potential for surface clutter to hinder the efficient use of the 52 CX or the XLT in the former burn sites. **Additionally, since demilitarization took place at the sites, submunitions can be expected (due to burial) at depths deeper than detectable.** If this is the case, as determined

by the SUXOS, a surface clearance will first be conducted at the effected explosives removal sites.

Once all site preparations have been completed within each site, the 52 CXs and XLTs will be used to locate anomalies within the grid. Each grid within each site identified for OE removal shall be swept using the procedures listed below. Each of the two OE removal teams will report directly to the SUXOS and will maintain a log of its activities.

- 1) Search Lanes. Each 100 by 100-foot grid will be subdivided into individual search lanes. These lanes will be five foot wide paths adjacent to each other, running parallel to the north/south boundary line of the grid. Search lanes will be laid out using pre-marked base lines with cones or twine laid between the base line marks to form the lanes.
- 2) Grid Search. Search personnel will start at one end of each lane and will move forward toward the opposing base line. During the forward movement, the detection instrument will be moved from one side of the lane to the other, with the forward movement and the swing of the magnetometer performed at a pace that ensures complete searching of the lane while also ensuring that the instrument is able to appropriately respond to subsurface anomalies.
- 3) Excavation of Flagged Items. Surface and near-surface anomalies may be excavated using small hand tools such as a hand trowel. **Extreme care will be taken to avoid striking the anomaly. When within 3" of the anomaly the hand trowel must be used. Digging directly above the anomaly is not permitted - dig to the side of the anomaly then over to the anomaly.** For a subsurface anomaly source that lies more deeply buried, excavation using hand shovels or earth moving machinery (EMM) will be conducted. If EMM is needed, the SUXOS will coordinate its acquisition and use by each investigation team. Whether EMM (operated by UXO-qualified personnel, A UXO Technician (UXO Tech) II with over five years experience is required at JOAAP) or manual digging tools are used, the earth overburden will be removed in one-foot lifts. The location of the anomaly will be redefined after each one-foot lift, and when the excavation is believed to be within one foot of the source, explorative excavation will be

conducted using hand tools only. This process will continue until the source of the anomaly has been uncovered or until directed to stop by the USAESCH Safety Specialist. Excavation with EMM will be conducted IAW applicable USACE regulations.

- 4) Anomaly Identification. The UXO Tech who located the item will conduct the initial anomaly identification. Once identified by the first UXO Tech, a second UXO Tech III will verify the identity, condition and hazards of the item. Those items that are fuzed, unsafe to move, or are submunitions will be marked with crossed red pin flags and disposed of daily by BIP. Those items that are positively identified as being unfuzed and safe to move may be removed from the excavation, transported to a consolidated disposal area located within the grid, and disposed of at the end of the day. **Any BLU-26B or any explosive component of a BLU-26B regardless of condition will only be blown in place (BIP) or remotely removed as stated in paragraph 5 below.** The BIPs or consolidated shots will be conducted before the team leaves the grid, or at the end of each day, whichever comes first. Those items that are identified as being non-hazardous ordnance scrap or scrap will be removed and segregated.
- 5) Mechanical Screening. Based upon the geophysical surveys conducted during historical site characterization activities, MEC items are suspected to exist at Site L2 in sufficient quantity and density to warrant the implementation of MEC screening activities during the removal action. A surface clearance will be conducted prior to mechanical screening operations beginning. Due to the possibility of encountering BLU-26s all operators must be protected from blast and fragments during mechanical soil screening and soil removal operations. If mechanical soil screening and soil removal operations are within the MSD of 492 feet then they must have K24 (14 feet) and shielding (IAW Table 6-1) during mechanical soil screening and soil removal if the operations are conducted concurrently. Anyone within the MSD of either operation will be provided K24 and shielding protection. Areas requiring screening will be removed in 1-foot lifts. An armored bulldozer or suitable substitute will be used to remove the soil in 1-foot lifts and placed into a stockpile. The area will then be checked with magnetometers to confirm if additional anomalies are detected. This will continue until magnetic anomalies are no

longer detected. Hazards associated with mechanically screening explosive (energetically unstable) contaminated soils are considered negligible because contaminant levels are not anticipated to exceed the 100,000 mg/kg threshold for explosive soils.

During implementation a separate area for mechanical screening for MEC will be established at Site L2 during clearance activities. The location of the mechanical screen will be within the site boundaries of Sites L2 to maintain the required MSD for the MGFD during operations. The mechanical screening area will be located a minimum of 50 feet from the excavation area. Soil excavated at the site will be loaded into hauling vehicles for transport to the mechanical screening area. Excavated material will either be direct loaded into the screening bin, or stockpiled near the screening operation if the bin is full to capacity.

OE-related soil and debris will be dumped into the screening bin and will fall through the screens inside that separate the soils and fines from the larger metal scrap. The earth moving equipment (bulldozer and excavator) used for this operation will be sufficiently armored to protect workers from blast and fragmentation hazards during an unintentional detonation. Equipment operators will remain inside the armored equipment at all times while earth-moving activities are being conducted. Minimum thickness of materials for potential use as fragmentation protection are provided in Table 6-1 below.

TABLE 6-1: POTENTIAL MATERIALS AND THICKNESS FOR FRAGMENTATION PROTECTION DURING MECHANICAL SCREENING OPERATIONS

MATERIAL	MINIMUM THICKNESS (INCHES)
4000 psi Concrete	2.05
Mild Steel	0.38
Hard Steel	0.31
Aluminum	0.85
LEXAN	3.06
Plexi-glass	1.79
Bullet Resistant Glass	1.33

Mechanical screening unit and engineering controls for fragmentation protection will be selected at the time of construction, with inspection and approval by the SUXOS prior to implementation.

The mechanical screen will be fitted with screen-sieve diameters small enough to totally eliminate the possibility of a BLU-26 passing through to the conveyor system. The diameter of the BLU-26 is 2.5 inches. The mechanical screen will be fitted with a series of screen-sieve diameters:

- 4-inch screen will be utilized to remove larger rocks, sod and debris.
- 2-inch screen will be utilized to remove shells, casings and other material. It is anticipated that any BLU-26 will be removed at this diameter screen-sieve
- 0.75-inch screen will be utilized to remove intact fuzes and smaller ordnance components that may be present in the soil.

No workers will be within the MSD of the mechanical screening unit while the unit is operating, except for the operator of the excavator loading the hopper. The only operators within the MSD will be the operators of the shielded earth moving equipment. The material separated on the screen will be gravity-fed down a chute and onto a conveyor belt, where the debris will be allowed to fall to the ground. After a pre-determined amount of soil has piled up, the screen loading operation will stop and the material will be spread out by an armored backhoe/excavator. A qualified UXO person, using a magnetometer, will search for any MEC that may be mixed with other material potentially presenting an explosive hazard (MPPEH). At this time a qualified UXO Technician will examine the screen for a potential stuck/lodged ICM. Oversized items such as clumps of grass that come off the screen will be spread out by a backhoe/excavator and a magnetometer will be used to locate MEC items. The remaining non-MEC scrap metal will be removed using a bar type magnet attached to a backhoe/excavator. Material potentially presenting an explosive hazard will be inspected and certified as explosives free. The inert munition debris will be placed into a bin and stored with other munitions debris metal. Eventually this material will go through a demilitarization process prior to being sent to an appropriate disposal facility.

If a live MEC round is stuck/lodged on the conveyor, it will be examined by UXO-qualified personnel for identity and condition. If it is acceptable to move, it will be removed in accordance with procedures established in the appropriate tech data for item identified and taken to a location at the site designated by the SUXOS for immediate detonation.

If an MEC item is deemed unacceptable to move or an ICM is located (an ICM will only be moved by remote means and K24 and shielding provided), all personnel will leave the conveyor line. UXO-qualified personnel will properly dislodge and transport the item (with approval of the OESS) from the conveyor by remote means (such as attaching a length of rope to the ICM with expandable foam or other suitable material). The length of rope will be at minimum 14 feet (K24) preferably longer. The rope will be attached to the backhoe/excavator that will pull the ICM to a predetermined location. The item will be remotely pulled to a location where it can be blown in place in accordance with established procedures.

All personnel not associated with the BIP operation will evacuate to a distance of at least 492 feet during the disposal.

After the UXO-qualified sorter has inspected the separated material for explosive residue, the UXO-qualified sorters will separate metal and non-metal scrap. Other metal site debris will be accumulated and sent to an appropriate recycling/disposal facility.

The disposal method for MEC and non-MEC items derived from screening operations is described in Section 9.3

9.3 OE Demolition

Reader see specific information contained in *Request for Waiver to the Army Prohibition on Characterizing, Maintaining, & Clearing Areas of Ranges Containing Submunitions or Improved Conventional Munitions for Joliet Army Ammunition Plant Ordnance Removal Action and Site Characterization Load, Assemble and Pack Facility Sites L2, L3, L11, L16, L21, and L34; Joliet Army Ammunition Plant, Wilmington, Illinois, 13 August 1999)*

10. NUMBER, COMPOSITION, TRAINING AND CERTIFICATION OF WORK

TEAMS

The number, composition, training and certification of the site personnel will be in accordance with Memorandum, DACS-SF, 30 Mar 2004, subject: *Improved Conventional Munitions and Submunitions* and DID OE-025.02: *Personnel Work Standards*. A maximum of 7 UXO qualified personnel, to include the supervisor, will comprise the team. The minimum team separation distance for all teams is the greater of 200 feet or the K50 distance of the most probable munition for the OE area. Additionally, the USAESCH Safety Specialist and the either contractor QCS or SSHO or Senior UXO Supervisor may be within the exclusion zone for a maximum of 9 UXO qualified personnel. For this operation a UXO qualified personnel will be a UXO tech II with a minimum of five years experience. Non-UXO qualified personnel will not be allowed in ICM/submunitions areas during UXO operations.

11. RISK ANALYSIS (SEE APPENDIX B)

Reader see specific information contained in *Request for Waiver to the Army Prohibition on Characterizing, Maintaining, & Clearing Areas of Ranges Containing Submunitions or Improved Conventional Munitions for Joliet Army Ammunition Plant Ordnance Removal Action and Site Characterization Load, Assemble and Pack Facility Sites L2, L3, L11, L16, L21, and L34; Joliet Army Ammunition Plant, Wilmington, Illinois, 13 August 1999)*

12. QUANTITY - DISTANCE

Reader see specific information contained in *Request for Waiver to the Army Prohibition on Characterizing, Maintaining, & Clearing Areas of Ranges Containing Submunitions or Improved Conventional Munitions for Joliet Army Ammunition Plant Ordnance Removal Action and Site Characterization Load, Assemble and Pack Facility Sites L2, L3, L11, L16, L21, and L34; Joliet Army Ammunition Plant, Wilmington, Illinois, 13 August 1999)*

13. TECHNICAL SUPPORT

The sub-contractor for this is project currently under a selection process. All on-site UXO qualified personnel will meet the training and experience requirements required by the USAESCH.

No chemical warfare materials (CWM) are suspected at any of the RA or SC sites. Additionally,

UXO qualified personnel will positively identify all OE items prior to the item being moved or destroyed. If suspected CWM is found, or if an OE item cannot be positively identified, the USAESCH Safety Specialist will request military support from the Technical Escort Unit or the 788th Ordnance Company (EOD), Fort McCoy, Wisconsin.

14. QUALITY ASSURANCE/QUALITY CONTROL

Reader see specific information contained in *Request for Waiver to the Army Prohibition on Characterizing, Maintaining, & Clearing Areas of Ranges Containing Submunitions or Improved Conventional Munitions for Joliet Army Ammunition Plant Ordnance Removal Action and Site Characterization Load, Assemble and Pack Facility Sites L2, L3, L11, L16, L21, and L34; Joliet Army Ammunition Plant, Wilmington, Illinois, 13 August 1999)*

Appendix E: Right of Entry Form



DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, U. S. ARMY CORPS OF ENGINEERS
P. O. BOX 1715
BALTIMORE, MD 21203-1715

December 17, 2008

Real Estate Division
Special Projects Support Branch

Mr. William Mains
USDA - Forest Service
30239 S. State Route 53
Wilmington, IL 60481

Dear Mr. Mains:

The US Army Corps of Engineers request your permission to enter the property located at Joliet Army Ammunition Plant, for a short period of time, sometime during a 90 day time period between February 16, 2009 and April 17, 2009 to survey for military munitions on your property. This may involve making a visual inspection of the property, surveying it with a metal detector or other instrument and collecting soil and/or water samples. We are not able to specify the exact dates for performing the site inspection at this time due to the unpredictable nature of the weather and other factors. However, we will attempt to notify you at least 3 days prior to commencing any activities. Please provide phone number and email address on the space provided on the Right-of-Entry (ROE) so that we can attempt to provide a date and time of our planned visits. If you decide to grant permission, please sign and return the enclosed ROE form and return it to this office.

After performing the site inspection, we will advise you of the results of our field survey. We will also discuss with you the next steps in the process for addressing any safety hazards that may be posed and seek your further permission before proceeding with any response action that may be required on the property if it is deemed necessary.

If you have any questions regarding this ROE form please contact Mrs. Lesley M. Logue at 410-962-5120, a member of my staff, and for any technical questions or further information, please contact Mr. Travis McCoun, at 410-962-6728, or via e-mail, at Travis.Mccoun@usace.army.mil.

Sincerely,

A handwritten signature in cursive script, reading "Craig R. Homesley", is written over the typed name.

Craig R. Homesley
Acting Chief, Real Estate Division

Enclosures

DEPARTMENT OF THE ARMY

RIGHT-OF-ENTRY FOR SITE INSPECTION

Joliet Army Ammunition Plant

Florence Township (W ½ SE ¼

Sec. 5 T.33N. R. 10E)

(Name of Formerly Used Defense Site)

(Property Identifier)

The undersigned, hereby grants to the Department of the Army, its employees, contractors, and subcontractors a right-of-entry on the property located in the State of Illinois, City of Wilmington, and described as:

USDA - Forest Service
30239 S. State Route 53
Wilmington, IL 60481

This right-of-entry is granted upon the following terms and conditions:

1. This right-of-entry may be exercised only for the purposes of making a visual inspection of the property described above and surveying it with a metal detector or other instrument for evidence of the presence of military munitions together with the right to collect such soil and/or water samples, as may be necessary to permit a determination of whether military munitions are present on the property.
2. This right-of-entry may be exercised at any time between 16 February 2009 and 17 April 2009.
3. This right-of-entry does not grant any right to enter into any structure or building located on the property described above.
4. This right-of-entry may be revoked in writing by the undersigned upon 15 days prior notice delivered to the Department of the Army at:

USACE, Baltimore
ATTN: CENAB-RE-S (Logue)
P.O. Box 1715
Baltimore, MD 21203-1715

Dated this 17th day of December 2008.

Terrence A. Chase
Signature

Acting Prairie Supervisor
Title
Midwin NTP

Craig R. Homesley
CRAIG R. HOMESLEY
Acting Chief, Real Estate Division
U.S. Army Corps of Engineers
Baltimore District

Appendix F: Data Quality Control Report

FIGURE 10-1

MMRP: (Installation name) DAILY QUALITY CONTROL REPORT		DATE _____																		
		DAY <table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td>S</td><td>M</td><td>T</td><td>W</td><td>TH</td><td>F</td><td>S</td></tr> </table>	S	M	T	W	TH	F	S											
S	M	T	W	TH	F	S														
USACE PROJECT MGR. _____	WEATHER TEMPERATURE WIND HUMIDITY	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td>BRIGHT SUN</td><td>CLEAR</td><td>OVERCAST</td><td>RAIN</td><td>SNOW</td></tr> <tr> <td>< 32</td><td>32 - 50</td><td>50 - 70</td><td>70-85</td><td>>85</td></tr> <tr> <td>STILL</td><td>MODERATE</td><td>HIGH</td><td colspan="2" rowspan="2">REPORT NO.</td></tr> <tr> <td>DRY</td><td>MODERATE</td><td>HUMID</td></tr> </table>	BRIGHT SUN	CLEAR	OVERCAST	RAIN	SNOW	< 32	32 - 50	50 - 70	70-85	>85	STILL	MODERATE	HIGH	REPORT NO.		DRY	MODERATE	HUMID
BRIGHT SUN		CLEAR	OVERCAST	RAIN	SNOW															
< 32		32 - 50	50 - 70	70-85	>85															
STILL		MODERATE	HIGH	REPORT NO.																
DRY	MODERATE	HUMID																		
PROJECT _____																				
JOB NO. _____																				
CONTRACT NO. _____																				

SUBCONTRACTORS ON-SITE:
EQUIPMENT ON SITE:
WORK PERFORMED (INCLUDING SAMPLING):
QUALITY CONTROL ACTIVITIES (INCLUDING FIELD CALIBRATIONS):
HEALTH AND SAFETY LEVELS AND ACTIVITIES:
PROBLEMS ENCOUNTERED/CORRECTIVE ACTION TAKEN:
SPECIAL NOTES:
TOMORROW'S EXPECTATIONS:

BY _____ TITLE _____

Appendix G: ERIS Database Format Example

eris file.txt

PREPARED=27APR20020000
PREPARATION_BATCH=VSCQ
Preparation_Type=
Procedure_ID=
Procedure_Name=
Comment=

RECORD:Result
ANALYTE_NAME=1,2,4-Trichlorobenzene
Analyte_Type=
Amount_Added=
Amount_Added_Units=
Detection_Limit=
Detection_Limit_Type=
Percent_Difference=
Percent_Recovery=
Percent_Recovery_Limit_High=
Percent_Recovery_Limit_Low=
Percent_Recovery_Limit_Type=
Quantitation_Limit=
Quantitation_Limit_Type=
Relative_Percent_Difference=
Relative_Percent_Difference_Limit_High=
Relative_Percent_Difference_Limit_Type=
Reporting_Limit=.167
Reporting_Limit_Type=CONTRACT REQUIRED DETECTION LIMIT
Retention_Time=
Retention_Time_Units=
RESULT=.167
RESULT_UNITS=Micrograms per Gram
Comment=

RECORD:Qualifier
LAB_QUALIFIER=Not detected